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THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER:
ELECTRO-PLATERS REVIEW.

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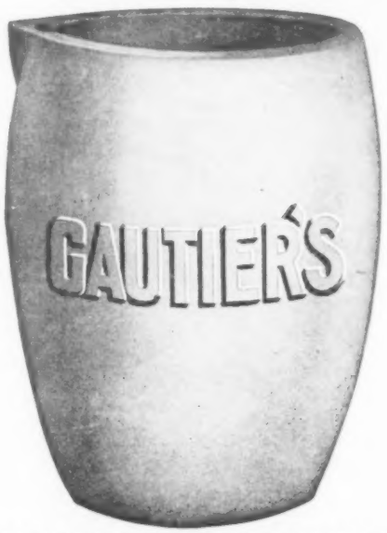

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THE METAL INDUSTRY

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THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER:

ELECTRO-PLATERS REVIEW.

Vol. 15. NEW YORK, JUNE, 1917. No. 6.

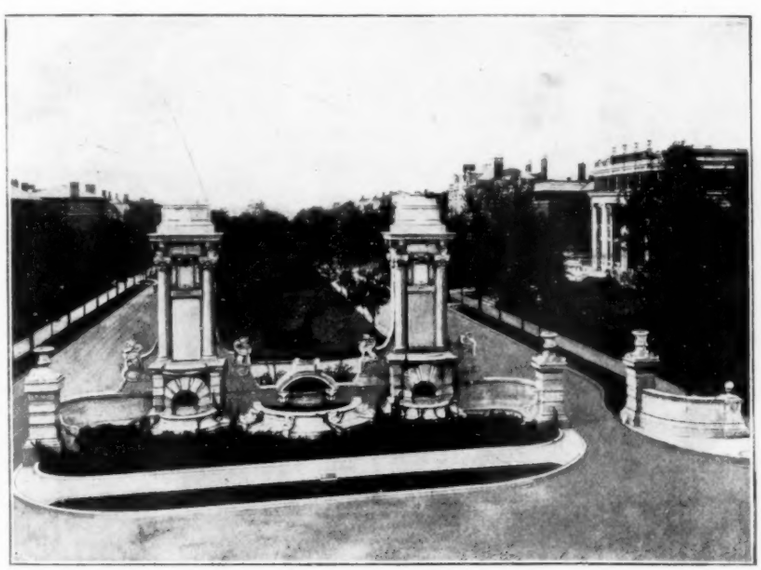
AMERICAN ELECTRO-PLATERS' CONVENTION

A Description of St. Louis, Missouri, Where the 1917 Convention Will Be Held July 5, 6 and 7, With Some Mention of its Electro-Plating Industries.

Written for The Metal Industry by H. H. Williams, President American Electro-platers' Society.

The new governor of Missouri has recently suggested that we change the old slogan of "You will have to show me, I'm from Missouri," to "We'll show you." That is what the city of St. Louis is doing this year to a great many conventions, large and small.

Being situated midway between the north and south it has all the progressiveness of the one and the genial cordiality of the other to welcome them all, and being the natural gateway between east, west and southwest it is easy of access on all the great twenty-six trunk line railroads all of which enter the one magnificent Union Station.



ENTRANCE TO ONE OF THE MANY FINE RESIDENTIAL DISTRICTS IN ST. LOUIS, MO.

THE PLANTERS HOTEL, ST. LOUIS, MO., THE ELECTRO-PLATERS' HEADQUARTERS.

One of the attractive features of the trip to those coming from the East is the crossing of the Mississippi river, the "Father of Waters," this is crossed on the Eads bridge from East St. Louis, Ill., or on the Merchants bridge from Granite City, Ill. Two other bridges now span this great river at St. Louis, the "McKinley" to the north and the Municipal to the south of business district. The latter was just recently opened for use to pedestrians and vehicles, the terminals for the electric and steam roads not being completed. This bridge is the largest double-deck steel-span bridge in the world, bridge and approach being two miles long.

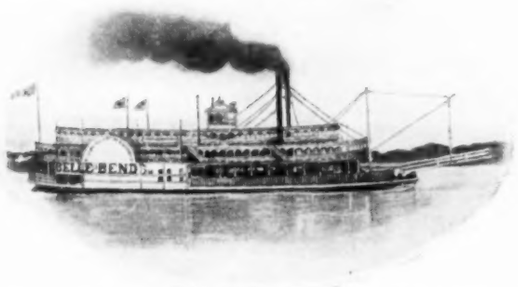
St. Louis was founded in 1764 by Pierre Laclede Siguest and was named in honor of Louis XV of France; in 1804, when Louisiana was ceded to the United States, there were but two American families in the town. In 1822 it was incorporated as a city. The first steamboat, "The General Pike," arrived at St. Louis in 1817, just one hundred years ago. The old Court House built in 1839 at Chestnut and Market, between Fourth and Fifth streets, is one of America's best pieces of Greek architecture, and was made historic by the slave sales that took place on its step prior to the Civil War.

General Grant once sold wood for a living in St. Louis, and his log cabin is still preserved. General Sherman is buried in Calvary Cemetery on the river bluffs to north of city.

St. Louis now covers 62½ square miles with a river

frontage of 18 miles and a population estimated in 1916 of 757,309. It has besides the many historic and natural points of interest, many beautiful public buildings and residences; the new City Hall and Municipal Courts buildings are the results of modern architecture and mechanical skill, the Art Museum and Jefferson Memorial in Forest Park contain rich treasures of art and historical relics, then there are the fine public libraries, schools, colleges, etc.

Shaw's Garden with its 125 acres enclosed by a stone wall, and having modern hot and greenhouses all arranged with scientific accuracy and filled with the finest specimens of rare and curious vegetation and



THE BELLE OF THE BEND, ON WHICH THE PLATERS WILL TAKE A RIDE.

plants, is known the world over as a place of special beauty. Then the several public parks located in all sections of the city contain 2,700 acres of ground, Forest Park the largest, containing 1,371 acres. These parks are all useful as well as beautiful, each being equipped as the best interests of the community requires, play grounds, swimming pools, baseball grounds, golf links, tennis courts, etc.

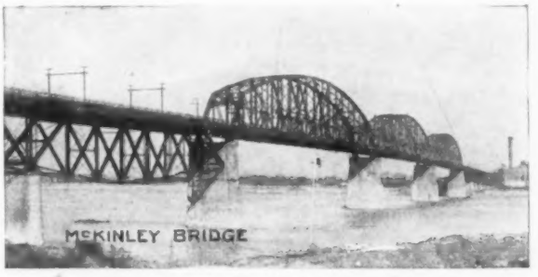
Jefferson Barracks, one of the largest military posts in the country, is within a few miles of St. Louis and is reached by trolley.

Within 15 miles of St. Louis the Missouri river empties into the Mississippi, and five miles above that the Illinois river joins the Mississippi, both of these interesting points will be passed during our river trip on the "Belle of the Bend" as part of convention program.

St. Louis being the fourth largest city in population is also the fourth city in manufacturing, having over 3,300 factories, employing 150,000 persons.

St. Louis claims to have the largest woodenware house in the world, the largest shoe market, the largest primary fur market, the largest wholesale hardware house and largest wholesale paper house in the United States, also leads the United States in the manufacturing of stoves, and is well represented in many other lines. The largest plating plants in St. Louis are those connected with the stove manufacturers, among them are the Bridge and Beach Manufacturing Company; J. T. McCarthy, foreman plating department; Buck's Stove and Range Company; T. F. Carson, foreman plating department; Charter Oak Stove and Range Company; Frank C. Rushton, secretary of St. Louis branch, of American Electro-Platers' Society, foreman plating department; Copper Clad Malleable Range Company; Majestic Manufacturing Company; G. Lamkemeyer, foreman plating department; Quick Meal Stove Company; Division American Stove Company, H. H. Williams, foreman plating department; Wrought Iron Range Company; other stove manufacturers within an hour's ride on trolley from St. Louis are the Baker Stove Works, C. L. Weygandt, foreman plating department; Belleville Stove and Range Company; Adam Karr Range Company; H. Eckhardt, foreman plating department; Quality Stove and Range Company; C. J. Koderhandt, foreman plating department; Orbon Stove and Range Company, Geo. Marsh, foreman plating department; and Roesch and Kohl, all located at Belleville, Ill., and the Auto Stove Works, L. Hofmeister, foreman plating department, located at New Athens, Ill. Other manufacturers having electro-plating departments are the Kokens Barber Supply Company, known in all parts of the world; H. J. Richards, editor of the "Monthly Review" of the American Electro-Platers' Society, is foreman plating department; St. Louis Brass Manufacturing Company, makers of "Everything in Brass" is a busy place, R. N. Goodsell is foreman plating department; Wagner Electric Maufacturing Company, manufacturers of motors and electrical goods, H. Drubelleis, foreman plating department; Frank Adam Electric Company, fixtures and equipment, P. Fressider, foreman plating department; St. Louis Coffin Company, L. L. Gaus, foreman; Kinloch Telephone Company, Geo. Brandt, foreman plating department; Boorum and Pease Loose-Leaf Book Company; Fred Medart Manufacturing Company; L. M. Rumsey Manufacturing Company; American Thermometer Company; Dawson Binder Company; The Brecht Company; Kraushaar Brass Manufacturing Company; American Foundry and Manufacturing Company; St. Louis Car Company; St. Louis Cash Register Company, and others.

Among the job plating shops are Musick Plating Works, W. H. Musick, E. J. Musick, J. H. Hartman, foreman plating department; St. Louis Plating Company, C. C. Deubler; Auto Plating Works, H. G. Nestman; Chas. Fischer's Plating Works; Electro-De-



THE McKINLEY BRIDGE OVER THE MISSISSIPPI, AT ST. LOUIS, MO.

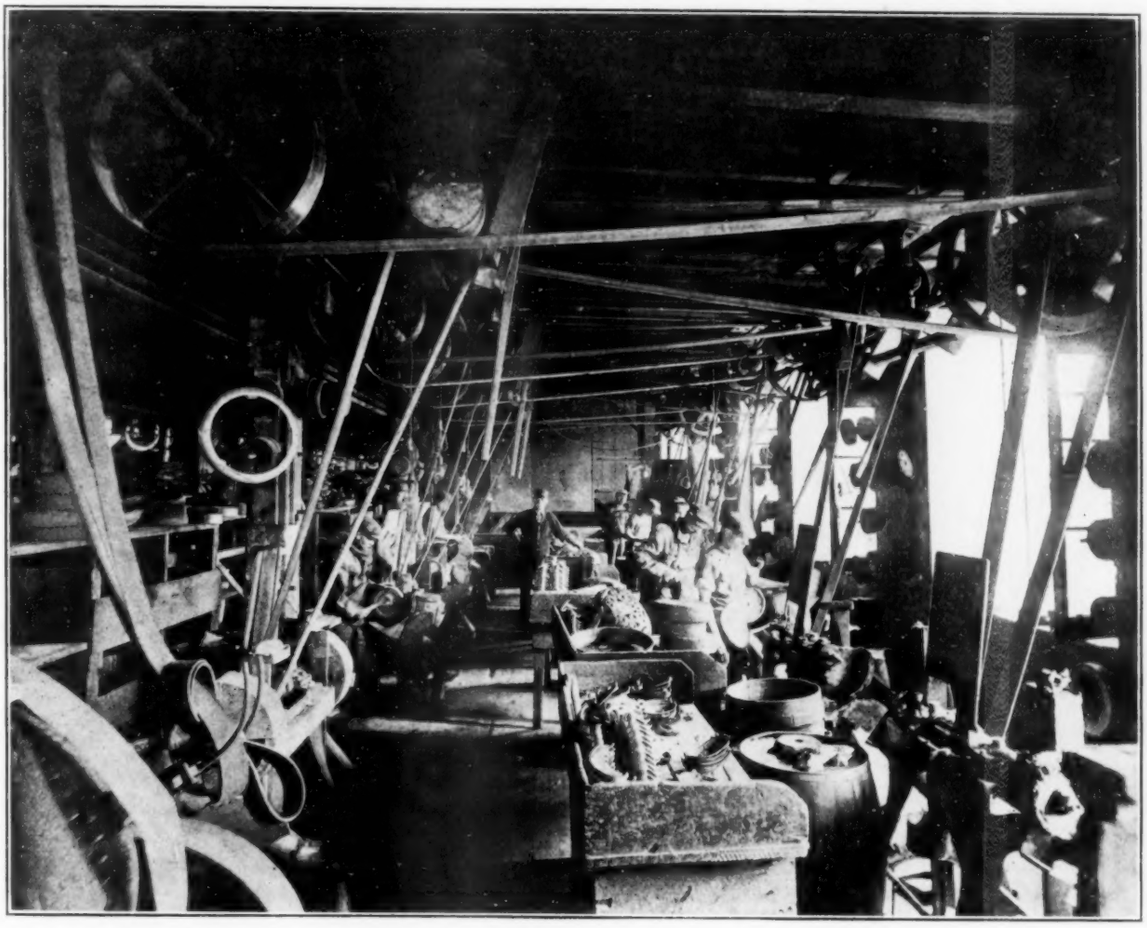
positing and Manufacturing Company; H. P. Seigel Plating Company, Aug. F. Stockman; Mueller Plating Company; S. L. Downing and Company; Rick. Felton Manufacturing and Plating Company; Columbia Plating Company, and others.

Some other firms represented in the active membership of St. Louis branch of the American Electro-Platers' Society are the Crescent Plating Works, W. H. Droehelmann, Evansville, Ind.; Irving Pitt Company, G. W. Gilson, foreman plating department, Kansas City, Mo., and the Coleman Lamp Company, of Wichita, Kansas, having as their foreman electroplater, E. W. Heil, member of Educational Bureau of Supreme Body, American Electro-Platers' Society.

It has been a source of pleasure to the writer to go back years before he saw the light of day, with some of the men who are still active in the electroplating business, and get from them the history of

electro-plating in St. Louis, which dates back to the early sixties when the M. M. Buck Manufacturing Company came here from Chicago and started in the railroad supply business, making lanterns and reflectors. This firm brought a Mr. McKim with them from the well known firm of Rodger Brothers to do silver-plating. The firm is now the Handlan-Buck Manufacturing Company, the very widely known concern in the same line of business, although not having had a plating department for several years.

About the first job shop here was started by a Mr. Scheidy who was succeeded about 1868 by Eaton and Green job silver platers, who located on second floor over F. A. Durgin & Company, manufacturers of silverware and silver platers. In 1870 B. S. Seville opened up another silver plating job shop, making a specialty of railroad and hotel work.



THE POLISHING DEPARTMENT OF BRIDGE AND BEACH MANUFACTURING COMPANY, ST. LOUIS, MO.

About 1877 the first nickel plating in St. Louis was done by the Buck Stove & Range Company, a Mr. Clement being the plater. This created a demand from other stove manufacturers for nickel plating and in a very short time at the request of the Filleys Stove Manufacturing Company, originators of the Charter Oak stoves, the firm of F. A. Durgin & Company installed a polishing and nickel plating plant. A little later this firm moved from 305 North 7th street to 208 North 3rd street and then became known as the Excelsior Plating Company. Among their first platers were a Mr. Wendover and Mr. Eirenfight. This company also received work by way of the river on boats from Keokuk, Iowa; Quincy, Ill.; Leavenworth, Kan.; Memphis, Tenn. and other places. Next this firm moved to 113-115 South 8th street, and with a change of management a foundry was added in connection and became known as the Excelsior Foundry and Plating Company. C. J. Linberg and Rush Tevis were the principal stockholders. Many of the active foreman platers in and around St. Louis at the present time were at that time employees of that concern.

The St. Louis Plating Works was started about 1878 doing job plating in silver and nickel, a Mr. Wingate being the plater. In May, 1881, this firm moved to 113 Morgan street and later to 11th and St. Charles streets, and was bought by the Emerson Electric Company, which operated a machine shop in connection with it in 1888.

Changes in the electro-plating firms seem to have been frequent from 1884 to 1890. Mr. McKim who was the first plater for M. M. Buck Manufacturing Company left them in 1872 and went into the job plating of silver with a partner under the name of McKim & Smith. In 1855 this was changed to McKim & Fischer and about 1890 Charles Fischer became sole owner, and still continues to do all kinds of job plating at 10 North Eleventh street.

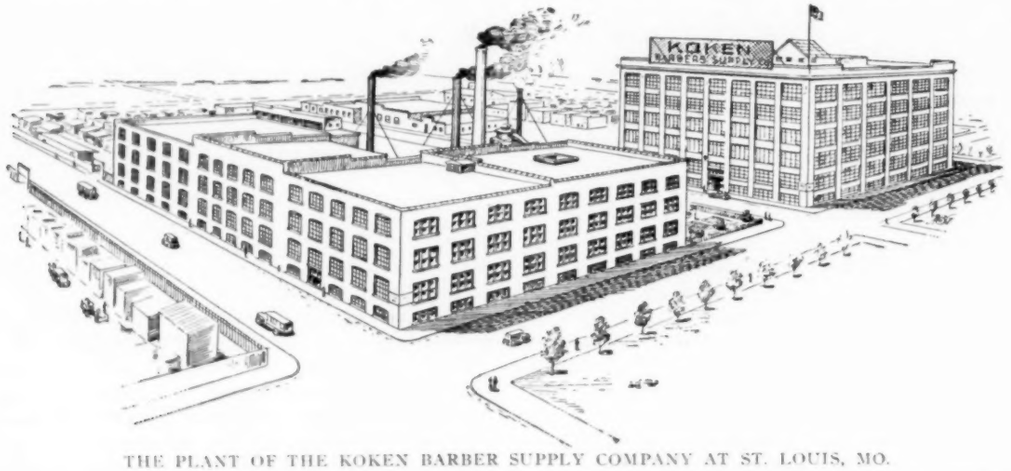
In 1855 the Excelsior Foundry and Plating Company was succeeded by M. D. Degge and W. H. Musick, who had been in their employ, under the name of Degge & Musick, who discontinued the foundry and enlarged the nickel plating and polishing departments, mak-

ing it the largest in the entire West at that time and doing the plating for the Filleys Stove Manufacturing Company, Bridge & Beach Manufacturing Company, Wrought Iron Range Company, Belleville Pump & Skein Company (now Belleville Stove Works of Belleville, Ill.), Western Stove Manufacturing Company, which time the name was changed to the Charter Oak Stove & Range Company. Within the next few years the Wrought Iron Range Company put in a plant, followed by Bridge & Beach Manufacturing Company, who had Fred Powers in charge, and in 1888, the Quick Metal Stove Company were equipped

THE PLATING DEPARTMENT OF QUICK MEAL STOVE COMPANY, ST. LOUIS, MO.

Evers & Temme, Gage & Horton, Curtis Stove Company, Ringen Stove Company, Snyder & Baker, now Baker Stove Works, of Belleville, Ill., and Comstock & Castle, and Bonnett & Duffy, of Quincy, Ill., and a little later for the Quick Meal Stove Company, and Johnson & Brandon Gasoline Stove Company, of St. Louis, and after some time for the Wilson Stove Company.

Shortly after Degge & Musick enlarged their plant, the Filleys Stove Manufacturing Company put in a plating department for their own work and J. F. McCarthy had charge of this for several years during for plating with Sam Ferguson in charge. While this work was leaving Degge & Musick, other new work kept coming in, among others from the Majestic Manufacturing Company. In 1889 Degge & Musick moved to 717-719-721 Market street, and as other stove shops installed plating departments their business broadened into other lines. In 1912, W. H. Musick bought out M. D. Degge and continued the business as the Musicks' Plating Works, taking into partnership with him, his son E. J. Musick. They have recently moved to their new building at 915-17-19 Chestnut street, where they have one of the best



THE PLANT OF THE KOKEN BARBER SUPPLY COMPANY AT ST. LOUIS, MO.

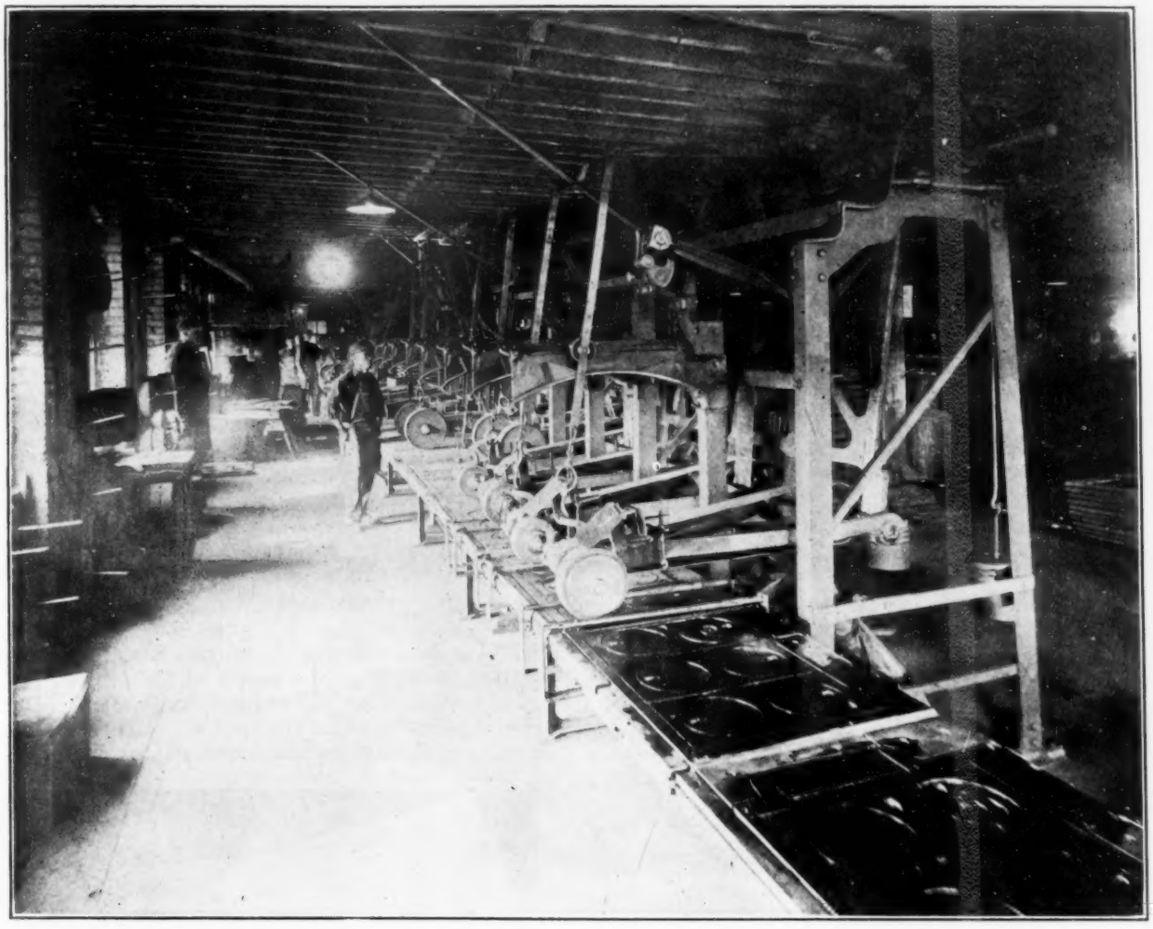
lighted and ventilated job shops in the country. J. H. Hartman is their foreman-plater.

The Majestic Manufacturing Company did its own polishing in 1893 and installed a plating department about two years later. George Lankemeyer the present foreman in charge has been with them from the beginning.

All of the stove concerns mentioned have outgrown their original factories, and have enlarged their former plants, while others have moved out to new locations. Among the latter are the Charter Oak Stove and Range Company, situated to the north not far from the Mississippi and surrounded by farm land; the Quick Meal Stove Company, division of American Stove Company, located on South Kingshighway has continued in the business under different management, but for several years with A. S. Dwyer as manager. This concern does a general job shop business and is now located at Twenty-second and Washington streets.

The Art Metal Company installed a plating department about 1887 with H. J. Richards in charge; this firm later consolidated and combined with firm of same name at Jamestown, N. Y.

Ludlow-Taylor Wire Company put in a plating department about 1900, but discontinued after about ten years. They did job work of all kinds and while in their employ Mr. Richards oxidized the wooden spindles used for ornamental work in several parts of our Union Station.



THE AUTOMATIC POLISHING MACHINES AT THE PLANT OF THE MAJESTIC MANUFACTURING COMPANY, ST. LOUIS, MO.

Boulevard, on drive between Forest Park and Tower Grove Park, a most modern factory, all well lighted and ventilated and having the largest plating department in St. Louis; and the Wrought Iron Range Company, located on Natural Bridge road.

While this covers most of the stove plating establishments, other lines also developed and some are mentioned here. About 1872, a Mr. Wadsworth started a job shop for silver-plating only and was succeeded in 1894 by S. S. Downing & Company, and which still continues under that name, but which is controlled by Mr. Fife.

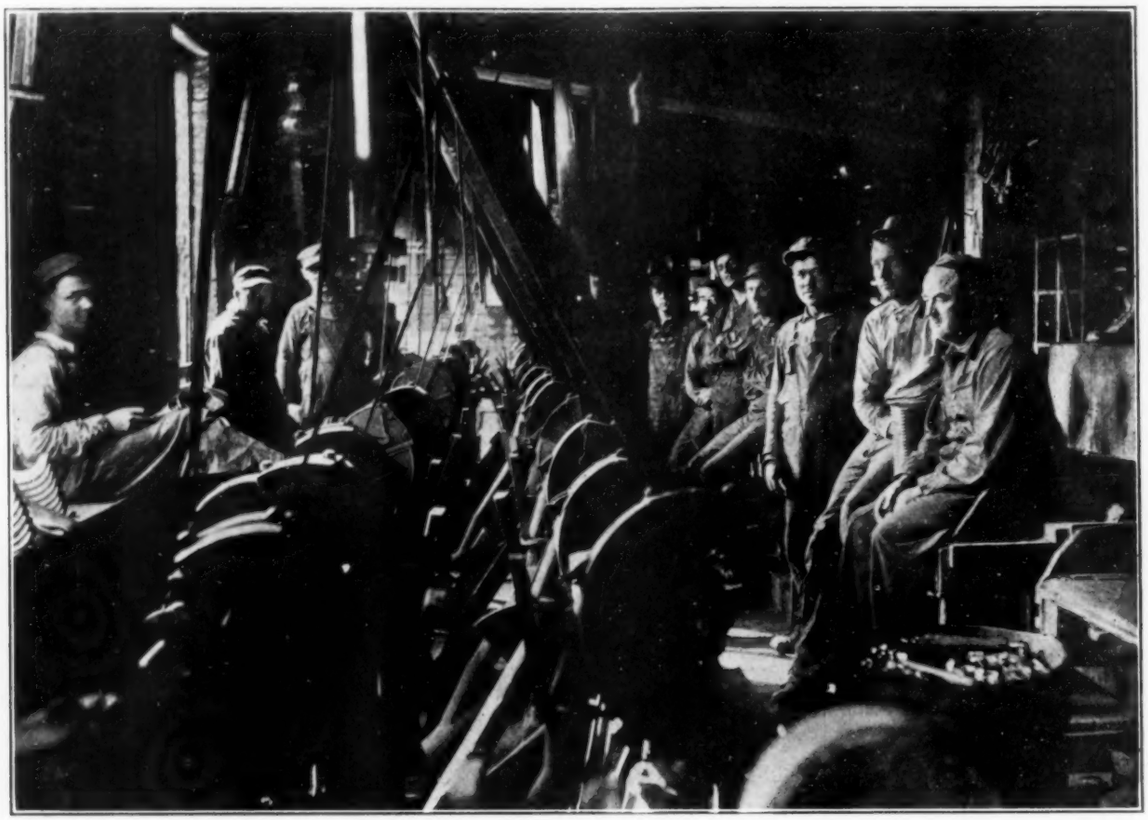
In 1889 or 1890, the Emerson Electric Company discontinued their plating department and sold it to the Electro-Depositing Company. This firm name

Other firms not mentioned before are the Hager Hinge Company,, Missouri Lamp Company, St. Louis Trunk & Hardware Company, Mueller Bros.' Plating Company, American Store Fixture Company.

Among the latest job shops are the St. Louis Plating Company, established in 1907, and the Auto Plating Company, established 1915.

The gas and electric fixture trade also had its part in developing the business of St. Louis. The Krausshaar Brass Manufacturing Company possibly being the oldest. The St. Louis Brass Manufacturing Company is now a large concern with a large variety of lines and finishes and the Frank Adam Electric Company is also a very up-to-date concern doing a large business.

It might not be amiss to mention that two important factors in the plating industry in this section for many years past were D. B. Moyer, better known as "Doc" and Harry E. Starrett, and while both are still in the harness the developing of trade has been left to younger men, and St. Louis has become a mecca for about all the "peddlers" of the many various lines connected with the plating and finishing of metals.



POLISHING DEPARTMENT OF BUCK STOVE AND RANGE COMPANY AT ST. LOUIS, MO.

For many years the individual platers of the East, apparently somewhat conceited, would not give the western man credit for having an average knowledge of the mysteries of the electro-deposition of metals, and even the western man looked with envy upon the "Wise man from the East" should one locate in their midst; however, shortly after the organization of the National Electro-Platers' Association, the founder of the society, C. H. Proctor and a few others had occasion to travel to the land of the Canaanites in the West, to spy out the possibilities of possessing the land, and while some reported about the terrible giants which controlled the land, the majority report was that it was a land flowing with milk and honey.

It was about this time that the St. Louis branch applied for a charter in the National Electro-Platers' Association, with nineteen signatures. This brought forth the remark from one who had not been in the West for several years, that there were not six real platers in the entire West. Thanks to our founder and the reorganizers this spirit has been eliminated and replaced by friendship, or to use the expression of Joseph Walters, of Richmond, Va., "Our Society is fulfilling part of God's plan to make humanity the Brotherhod of Men."

The West has and is contributing loyal support of the Society, for to date it has had as active supreme officers J. H. Hansjosten, H. E. Willmore and Oscar E. Servis of Chicago Branch and H. H. Williams and H. J. Richards of St. Louis Branch; these men having been honored by the Supreme Society have been faithful in the performance of their duties.

The writer uses the geographical terms here only for the purpose of interesting all in the coming convention, realizing we must show that outside of regular delegates, there will be plenty to interest all others.

POLISHING DEPARTMENT CHARTER OAK STOVE AND RANGE COMPANY, ST. LOUIS, MO.

The dates selected for the convention give an op-

portunity for at least a week's stay in St. Louis, being a national holiday week, at least it affords an excellent chance to leave on the Fourth of July, arriving in St. Louis early Thursday morning, the fifth, in time for the opening session.

The Reception Committee will be on hand early to welcome and register the delegates. The program as revised to date is as follows:

THURSDAY, JULY 5.

8 to 9:30 a. m.—Registration.
9:30 a. m.—Executive Board meeting.
10 a. m.—Opening session of convention, after which a group photograph will be taken on old Court House steps, across from hotel.
1:30 p. m.—Reports of officers.
2 p. m.—A visit to several plating plants for the men, while the ladies will be taken through the shopping district and given a birdseye view of St. Louis from the top of the Railway Exchange Building, etc.
8 p. m.—Educational meeting, reading of papers and discussion.

FRIDAY, JULY 6.

9.30 a. m.—All aboard "The Belle of the Bends" for a trip up the Mississippi River, returning at 6 p. m., all day on the river. Dancing between session.
10 a. m.—Business session on boat.
2 p. m.—Educational meeting on boat; reading of papers.
8 p. m.—Educational meeting, papers, etc., for men. Reception to ladies by Women's Council Convention Bureau.

SATURDAY, JULY 7.

9 a. m.—Discussion of exhibits.
10 a. m.—Business session, election of officers and choosing next convention city.
2 p. m.—Automobile trip.
6:30 p. m.—Annual banquet; installation of new officers; farewell till 1918 at Detroit, Mich. (?)

The Planters Hotel has been selected for headquarters on account of the advantages it affords for conventions, the entire second floor being used for this purpose, the lobby on this floor is unexcelled. The rates secured for our convention are very reasonable, single rooms with bath, $2 and $2.50 per day; rooms for two persons with bath, $3 per day; single rooms, without bath, $1.50. Rooms should be reserved by application direct to hotel, mentioning the American Electroplaters' Society convention. All meetings, except the two to be held on the boat, will be at this hotel.

Most of the manufacturers in this section having in their employ, members of the American Electroplaters' Society are very much interested in this convention, and are giving our members special privileges in order to make it a success. Nearly every member of the St. Louis Branch will exhibit a finished article, such as stoves, barber chairs, electric and gas fixtures, as well as smaller samples and it is the purpose of the publicity committee to distribute a few thousand cards of admission to the exhibit among business men throughout this section and to others interested in our work.

Several manufacturers of plating supplies have made application for space in connection with exhibit.

Every member of St. Louis Branch is on a committee, with something to do; the following are chairmen of committees: Publicity, H. H. Williams; Educational, H. J. Richards; Entertainment and Reception, E. J. Musick and Exhibit, F. C. Rushton.

Come to St. Louis and "Let us show you."

CHARLES FISCHER

Who began work for Eaton & Green in 1868 and is still actively engaged in the plating business. His specialty has always been silverplating. He not only holds the record of nearly 50 years at this unhealthy (?) business, but also the record in weight and good nature. His place of business is at 16 N. 11th St.

THE OLD COURT HOUSE, ST. LOUIS, MO.

W. H. MUSICK

He is the best known electroplater in the vicinity of St. Louis, for after several years' experience he became partner in Deggs & Musick in 1885, and since that time has done plating for about every firm in this section at different times. He is still active in business under the name of Musick's Plating Wks., 915-17-19 Chestnut St.

A NICKEL STRIP.

A good nickel strip is made up as follows:

Nitric acid 36° Baume.....	½ gallon
Sulphuric acid 66° Baume.....	½ gallon
Hydrochloric acid 18° Baume	¼ gallon

The strip should be made up in a two-gallon jug in the following manner: Pour the nitric acid in first, then the sulphuric acid and let stand over night. Then add the hydrochloric acid. This should be done out of doors as some sulphur and chlorine fumes arise. Let this solution stand for two days before using and, if it works too fast, add about four ounces of sulphuric acid at a time until there are no gas bubbles given off or try an old piece of nickel-plated iron. This solution works best cold and in warm weather the jar should be set in cold water. After being used for some time a white precipitate forms and the solution should be allowed to settle and then the clear solution can be poured off.

Under no circumstances should any water get into the acid and the work must be perfectly dry before putting in the solution.—J. C. K.

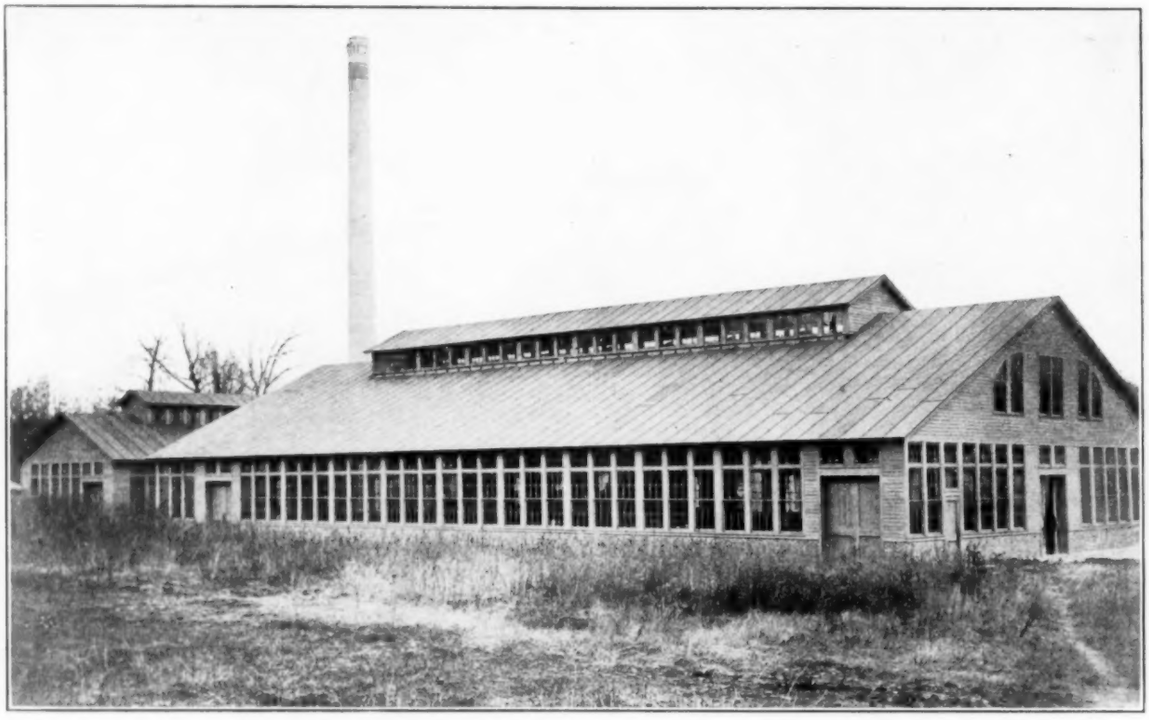
THE DEVELOPMENT OF A ROLLING MILL

A Description of the Establishing and Growth of the Stamford Rolling Mills Company at Stamford, Conn.

By L. J. Krom.

The story of the Stamford Rolling Mills Company reads like a romance whose chief virtue lies in the fact that it is true. By sheer pluck and perseverance and supported by a firm belief in their own ability a half dozen men have in the short space of barely two years created an industry which has taken its place among the oldest and most firmly established plants of the United States and indeed of the world. Contrary to all the established precedents of the rolling mill business and absolutely against the recognized traditions handed down from father to son in the metal trades, that no one not brought up in the business or who has not had previous experience could succeed in establishing a mill, these men have done just this thing and to-day, as said above, the Stamford Rolling Mills Company, must be reckoned with as a factor in the brass business.

When this company was organized in 1915 and bought the idle plant of the United German Silver Company at Springdale, Conn., and proceeded to enlarge it, the knowing ones in the business looked upon it as either a stock speculation or a move to make a quick profit by reselling the plant to some one of the larger corporations. When the Stamford people saying nothing went ahead and spent larger sums of money in building up the little plant of two pair of rolls and fourteen fires to one of fourteen pairs of rolls and one hundred and eight fires, notice was taken of the new company and it began to be taken seriously. In a short time, in fact, in the same year of its organization the little company found itself long on orders and short on capacity. Just about this time the latter part of 1915, the Stamford Company heard that the plant being built in Stamford by the American Cupro Nickel Co. might be purchased. Harry Wright, vice-president and general manager of the Stamford Company, got in touch with them. "Yes, we will sell," said they. "Let me have over night," pleaded Mr. Wright. "Can't do it." Mr. Wright thereupon bought the plant and told his directors about it afterwards!



THE PLANT OF THE UNITED GERMAN SILVER COMPANY AS IT WAS IN 1915 WHEN PURCHASED BY THE STAMFORD ROLLING MILLS COMPANY AT SPRINGDALE, CONN.

Now began most strenuous times for the new company. The capital stock was increased to $2,335,000, and all taken up by the original organizers, no outside help being sought. At a time when rolling mill material and men were at a premium and hard to get at that, Mr. Wright and his co-workers proceeded to not only complete the cupro-nickel plant now called Mill No. 2, but also to gradually increase the daily shipment of finished metal in the form of brass sheet, strip and disc and German silver from the Springdale plant.

The amount of progress made at the Springdale plant from the time the company took hold of it in 1915 up to the present time is best shown in our photographs, Figs. 1 and 2. While these pictures give a fair idea of the growth of the plant from the outside it would require a great many pictures and thousands of words to depict the development that went on in-

side. No one who is not connected with the rolling mill business or who has not had some actual acquaintance with it can really appreciate what a colossal task this has been. In actual figures the progress is shown most vividly by stating that the help has increased from thirty to about fifteen hundred and the production in metal of all kinds from 2,400,000 pounds to 40,000,000 pounds per year!

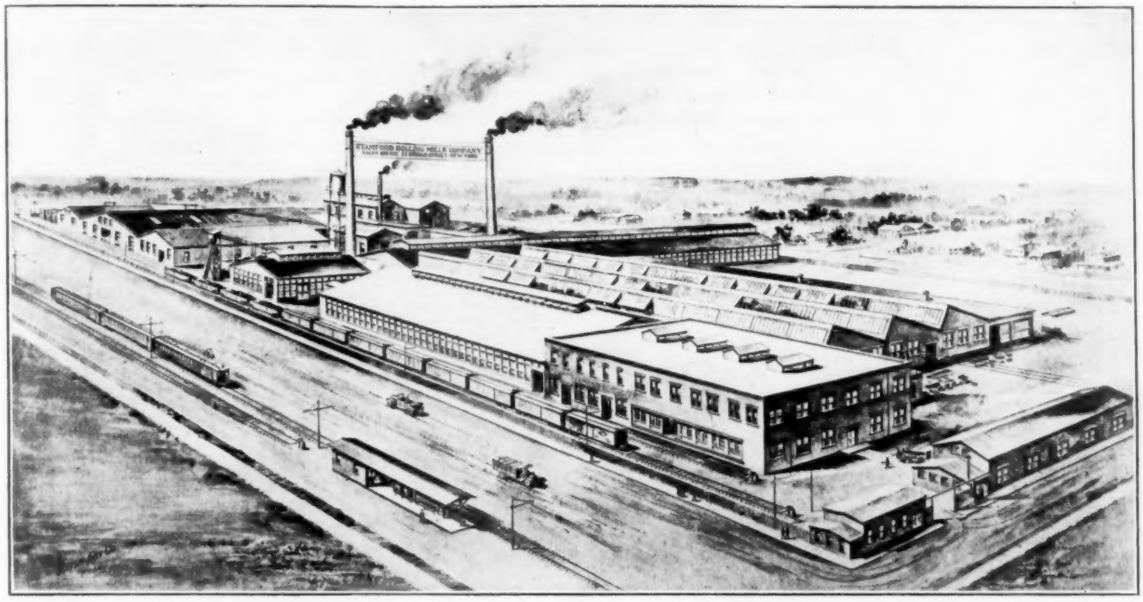


FIG. 2.—THE SPRINGDALE PLANT, MILL NO. 1, OF THE STAMFORD ROLLING MILLS COMPANY, AS IT WAS JANUARY, 1917. HERE GERMAN SILVER AND COPPER PRODUCTS ARE PRODUCED.

THE SPRINGDALE PLANT, MILL NO. 1

The Springdale mill is on the New Canaan branch of the N. Y., N. H. & H Railroad and an extensive railroad siding enables the easy unloading of raw material and the shipment of finished product, while an industrial railway throughout the plant facilitates the movement through the mill of the materials essential to the manufacture of metal products. As said before the equipment of the Springdale mill includes fourteen sets of rolls. These are: one set of 20 by 24 inch breaking down rolls run by a 250 horse power motor, two sets of running down rolls one 20 inch and one 18 inch and eleven sets of finishing rolls two of which are 18 inch, three of 10 inch and six of 12 inch. The running down and 18 inch finishing rolls are fitted with 3 roll motor driven coiling machines, while the other finishing rolls are equipped with fully automatic blocking machines. For annealing purposes the plant has one double chamber and two single chamber oil and underfired muffler furnaces of W. S. Rockwell Company design. There are also the necessary pickling tubs, sprinkling system for the rapid cooling of metal pan pullers, straighteners, overhauling or scalping machines, drying out and slitting machines and all the other apparatus that is needed in an up-to-date mill.

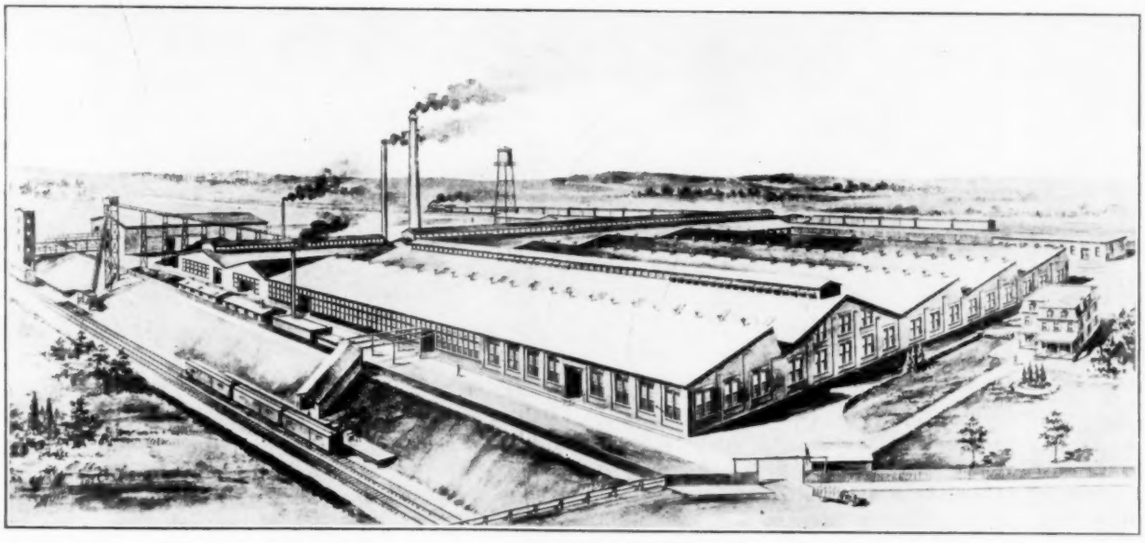


FIG. 3.—THE STAMFORD, CONN., PLANT, MILL NO. 2, OF THE STAMFORD ROLLING MILLS COMPANY, IN JANUARY, 1917. HERE THIN GAUGE BRASS AND CUPRO-NICKEL ARE MADE.

The metal rolling capacity of this plant now keeps busy three casting shops equipped with, as mentioned, 108 fires and containing also the necessary paraphernalia such as molds, railways and electric hoists for hoisting the crucibles from the furnaces and enabling the caster to pour into the molds. In addition to the casting shops there is a building devoted to the handling of scrap metal which is put into crucible form by means of hydraulic presses or bundling machines, which produce what are known as cabbages. There is also a complete recovering plant in which the metal lost in the ashes of the casting shop fires and dropped around on the floor and other parts of the plant during the process of transportation, is all completely recovered and sent back to the casting shop.

the mill is cut down to the necessary voltage, 440 V., 60 cycle, 3 phase, by a series of transformers which are contained in a separate house, which also contains the apparatus for controlling the current used for the lighting circuit of the entire plant.

One of the most important features of the conduct of the business of the Stamford Rolling Mills Company is the attention given to the scientific or technical side of the industry. Contrary to the old time practice of leaving the production of the metallic alloys entirely to the man in charge of the casting shop, the Stamford people have so perfected the technical methods of the making of their alloys that the variation of the mixtures is practically controlled by the technical force. The photograph, Fig. 4, shows the equipment of the laboratory where the necessary an-

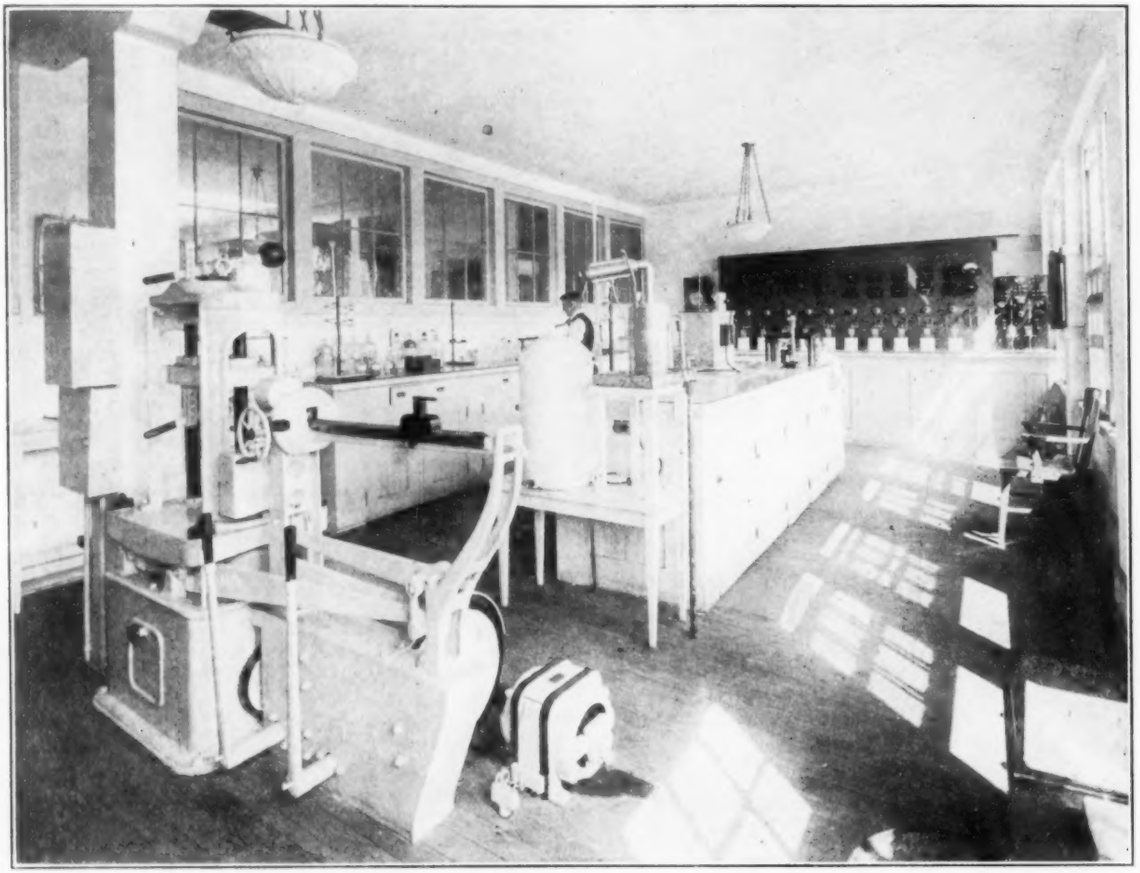


FIG. 4.—THE CHEMICAL AND PHYSICAL LABORATORIES OF THE STAMFORD ROLLING MILLS COMPANY AT SPRINGDALE, CONN.

There is also a complete boiler house for furnishing steam and heat. In this house are two 75 horse power boilers which are used for heating purposes only. Steam pressure is kept at between fifty and sixty pounds and enters the shop and mill through a reducing valve at a pressure of one to two pounds. The power for the mill machinery is electricity and is purchased from the local service company. More than 500,000 kilowatt hours per month is the amount of energy consumed. Motors having a rated capacity of 1,500 horse power are installed, all of the large machines in the mill being equipped with independent motors and they are so grouped that in case of accident or some other cause only one of a lot of machines is shut down at one time. The current used in

alyses and tests are made to not only formulate the mixtures used in the business, but also to control the chemical and physical character of the output. The one laboratory at the present time is performing the necessary scientific work for both plants of the company, but with the rapid growth being experienced it would not be surprising to see a duplicate of this admirably well designed and equipped plant installed at the No. 2 mill of the company.

The finishing department of the Springdale plant contains all of the necessary machinery that is usually seen in a well equipped brass mill finishing room. The equipment includes sawdust drying boxes, slitters, straightening rolls, circular trimmers, coilers, automatic roll straighteners and shearing ma-

chines, together with several machines of the guillotine type for large sheets of metal. There is a press department containing two three hundred ton disc cutting presses equipped with individual motor drives, while there are smaller discing presses, one having a shear, and also a cupping press.

THE STAMFORD PLANT

This plant, which is known as Mill No. 2 shown in Fig. 3, is now practically a duplicate of the Springdale plant or Mill No. 1, except that it does not have at its disposal quite so many casting shop fires, there being here two casting shops of forty-eight fires each, making ninety-six in all and the general arrangement is practically the same as that of the Springdale shop, which is shown in Figs. 5 and 6.

The rolling mill equipment of Mill No. 2 is very similar to that of Mill No. 1, there being fourteen mills as at Springdale. The first breaking down mill that the metal enters is 20 by 24 and is driven by a 250 horsepower motor. A second pair of breaking down rolls of the same size is used for lighter reductions and has only a 150 horse power motor. The two running down mills consists of a double mill with two sets of 20 by 24 inch rolls and driven by individual 200 horsepower motors. The speeds of these rolls are usually from ninety to a hundred feet per minute for the breaking down, two hundred feet for the running down and from two hundred to two hundred and twenty-five feet per minute for the finishing.

The finishing mills in Mill No. 2 are worthy of special mention, due to the special features of their form and arrangement. There are eight of these finishing mills with 12½ by 16 inch rolls arranged in four double sets. Each mill is self-contained, the rolls being driven by 75 horsepower motors and the pinions are enclosed, while the lubrication is by forced feed. The spindles in these mills are made of forged steel and the coupling is a universal joint which makes a connection between the driving pinions and roll neck that is free from back-lash. Cut steel herring-bone gears and steel rolls, which are water cooled internally, are used and the mills are equipped with full automatic blocking machines. The arrangement of these mills is such that they effect a great economy in floor space and one roller can operate two stands.

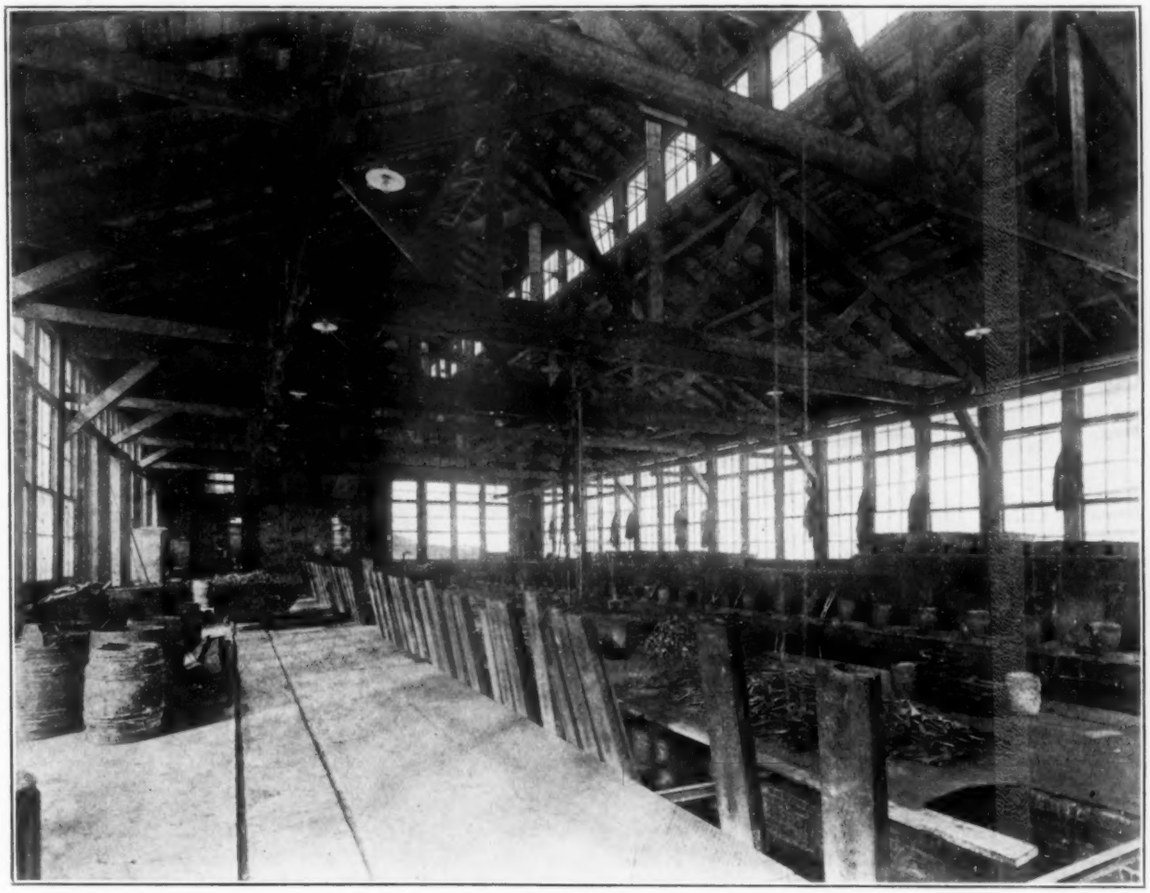
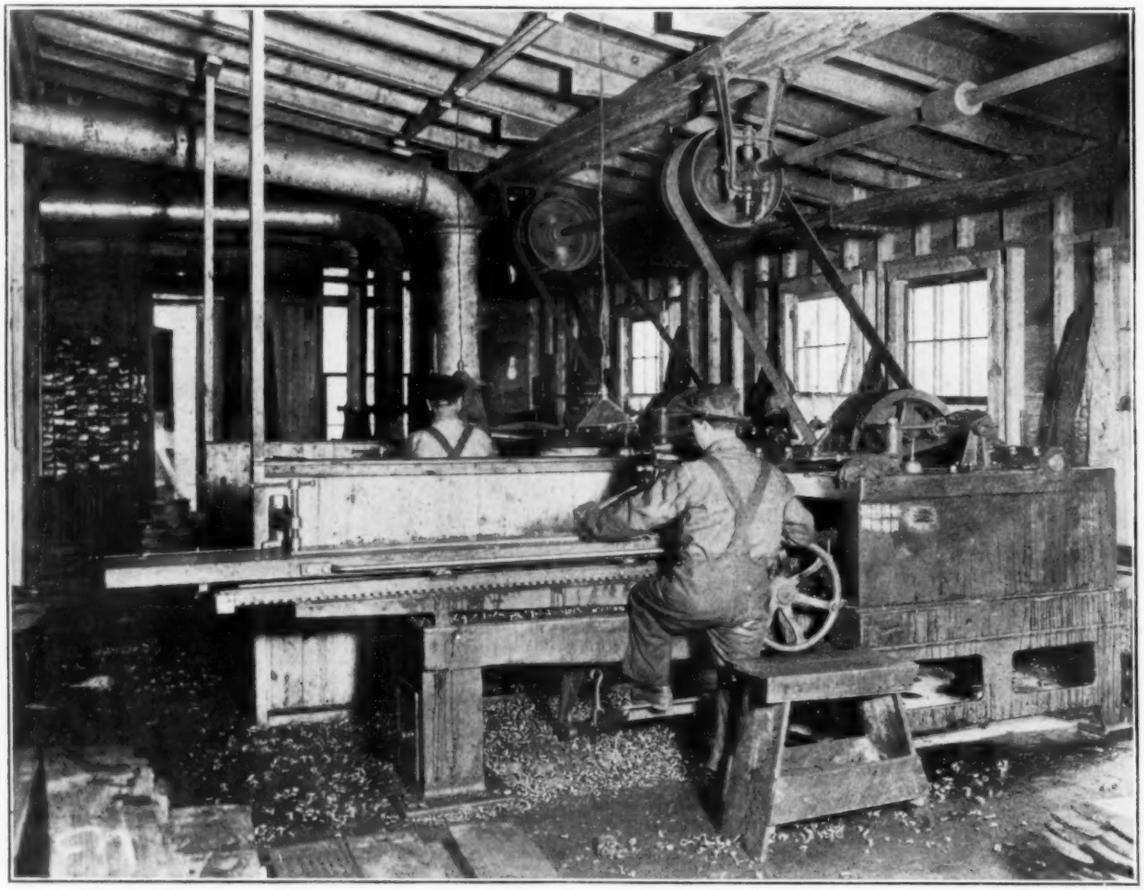


FIG. 5.—A VIEW IN NO. 2 CASTING SHOP AT SPRINGDALE, CONN., PLANT OF STAMFORD ROLLING MILLS COMPANY.

The annealing equipment of Mill No. 2 is similar to that in Mill No. 1, there being three double chamber under-fired oil furnaces with their automatic arrangement of charging and pulling systems which are so arranged that when pans of annealed metal are pulled out from the front of the muffles other pans of metal to take their place are drawn in from the rear. The cooling beds for these muffles are duplicates of those in Mill No. 1. An elaborate equipment of pickling tubs is furnished and besides those situated near the cooling beds there is a set in front of each pair of finishing rolls. These tubs are 4 by 20 feet in size and each tub is surrounded by a grating covering the drainage pit beneath.

In addition to the regular pickling outfit in the mill there is a special building devoted to the pickling and drying out machines for treating cupro-nickel. As is well known the pickling of this metal requires special handling and the Stamford Company has devised a particularly satisfactory formula for cleaning off the oxide film which is formed on the metal when it is annealed. This formula obviates the usual noxious fumes which are generated when cupro-nickel is pickled in a solution containing nitric acid. The four sets of pickle and rinsing tubs that are housed in the cupro-nickel building are served by a traveling crane, while a drying out machine is installed in front of each set of tubs.

Mill No. 2 is also equipped with a complete machine shop and tool room which occupies a separate building and which contains all the machinery necessary for the repair and up-keep of mill presses and dies, while another building contains two 75 horsepower boilers for heating purposes. Mill No. 2 is run by electricity and the rated capacity of the motors installed in this mill is about 2400 horsepower. The electric power is purchased from the local power company and is transformed in a separate building, as at Springdale, down to the required voltage for driving the machinery in the mill.



OVERHAULING MACHINES AT WORK AT THE SPRINGDALE, CONN., PLANT OF THE STAMFORD ROLLING MILLS COMPANY.

SAFETY, SANITATION AND HEALTH

Particular attention has been paid by the Stamford Company to the safety, convenience and comfort of their help. To this end there is an elaborate system of lockers, toilets, and washing facilities housed in suitable buildings at both plants. There is also a completely equipped restaurant building where a substantial meal is served at small cost to all employes desiring it, under the supervision of the company. The health of the workers is looked after by a company physician aided by a graduate trained nurse, there being a specially designed first aid and hospital room fitted up where all minor injuries are taken care of and in fact some quite serious operations can be performed for the equipment of the hospital includes many of the necessary apparata for such work.

METHODS OF PRODUCTION

As the process of producing various forms of brass has been exhaustively described in the columns of THE METAL INDUSTRY* it is not necessary to repeat it here, but the state of refinement to which the Stamford Company has brought the methods of manufacture is worthy of mention. In this connection the progress made is particularly well described by W. C. McGrath, assistant to the general manager, in the May issue of "The Sheet of Brass," a little journal published by the company for the benefit of their employes and customers. This article by Mr. McGrath so completely covers the ground that it is

*The Manufacture of Wrought Brass Plate, Sheet, Rod, Wire and Tube appeared in THE METAL INDUSTRY in 1910, 1911, 1912, 1913 and 1916. This is the only complete article on the manufacture of brass that has ever been published. It is still obtainable in the bound volumes of THE METAL INDUSTRY.

considered worth while to include it here. The article is as follows:

IMPROVEMENTS OF A DECADE IN ROLLING MILL PRACTICE

Were a brass rolling mill employee who was thoroughly familiar with the machines and methods in use

FIG. 7.—THE NEW COPPER MILL BUILDING AT SPRINGDALE, CONN., PLANT OF STAMFORD ROLLING MILLS COMPANY.

a decade ago to remain entirely out of brass mills and then step into a modern mill of the 1917 model he would undoubtedly recognize but a few changes on his first quick glance around, but a detailed study of machines and methods would show him that improvements which in a number of ways are very decided ones over the older methods are now the order.

To begin with, the modern mills are of brick and steel construction with plenty of head room, and of the saw-tooth roof variety. This construction is ideal as it insures perfect light and perfect ventilation in every part of the mill. The floors of iron plates and properly laid wooden paving blocks are much superior, especially for easy trucking, than the old time floors of iron plates and three-inch planks which were constantly wearing down in spots.

Individual electric-driven mills are now the rule rather than the exception, and in a number of ways they are better than the old steam engine drive. Any particular mill can be shut down when it is not required, and again there is not the danger, which is ever present in a plant where the power is furnished by a single steam drive of a complete shut down of the plant when an accident happens to the main drive.

A number of the larger modern mills very properly treat their breaking down rolling operation as a separate proposition from the running down and finishing rolling operations. Extra heavy mills using 22" or 24" diameter rolls if iron, or 20" diameter if steel, turning at a surface speed not exceeding sixty feet per minute and with a roll length of thirty inches, make an ideal outfit for breaking down mills, insuring maximum production and minimum loss of time due to the failure of any bars to immediately "bite" or catch in the rolls.

Running down and finishing rolling have changed but little aside from two points, namely, the greatly extended use of small high speed mills and improved

GENERAL MANAGER HARRY WRIGHT IN HIS OFFICE AT SPRINGDALE, CONN., STAMFORD ROLLING MILLS COMPANY.

blocking methods. It has been proven that the cheapest and best way of turning out very thin gauge material, especially certain sizes which run into comparatively large tonnages, is by doing the finishing rolling, from No. 15 B. & S. gauge down, with small 10" or 12" diameter high speed mills. Steel rolls in these small mills give much better satisfaction than the usual chilled iron type.

All up-to-date finishing mills, whether of large or small diameter, are now equipped with fully automatic blockers which not only permit much faster roll speed and consequently rolling economy, but are entirely free from danger as compared with the old style hand operated blockers in common use ten years ago, which were responsible for taking an operator's arm off occasionally.

The old three and five-roll belt-driven bull straighteners have given way to the present motor-driven nine roll straighteners which rarely fail to straighten a bar on one pass through, whereas two and three passes were formerly required. The old five-roll finishing room straighteners are now replaced by seventeen-roll straighteners which do more and better work than those formerly used.

Five years ago some plants were installing milling machines to replace overhaulers, but there was as much difference between the milling machines of that time and the best of those now in use, as there is between the original curved-dash Oldsmobile compared with the present eight cylinder "Olds." The work formerly done by the old style 6" and 8" stroke belt-driven overhaulers is now performed by extra heavy 10" and 12" stroke motor-driven overhauling machines. For certain classes of work such as nickel alloys, cupro-nickel, aluminum bronze, etc., these machines are better adapted than the newer type of milling machine, which in turn is especially well adapted for high, low, leaded and cartridge brass.

The automobile industry has been directly responsible for a number of improvements in rolling mill practice, in that large orders of single sizes permit of the use of multiple-type machines, among others, multiple slitters which slit three or four bars of metal at one time, instead of one bar, which is the usual practice. Also multiple straighteners and cutting off machines.

The large tonnage of cartridge brass handled in the last two years has also been responsible for the de-

MR. EVANS R. DICK
President and Director.

MR HARRY WRIGHT
Director, Vice-President and General Manager.

MR. WILLIAM C. McGRATH
Assistant to General Manager.
Springdale.

MR. MELVILLE K. WEILL
Assistant General Manager.
Stamford.

MR. MAX WRIGHT
Superintendent Mill No. 1.
Springdale.

MR. ROBERT WHIDDON
Night Superintendent Mill No. 2.
Stamford.

velopment of special machinery designed to handle this particular class of work economically and efficiently. Another feature now commonplace, which was totally lacking ten years ago, is the extensive use of lifter or transveyor trucks for the quick and efficient handling of batches of material from point to point in the mill. Electric motor-driven tractors come under the same heading as the above mentioned lifter trucks.

Overhead electric cranes of both the monorail and the more familiar double suspension traveling crane type are used now more than ever before for the efficient handling of material.

HOT COPPER MILL

An interesting development at the Springdale plant is the installation of a hot rolling copper mill with its accompanying heating furnace. A separate building, shown in Fig 7, is to be utilized for this purpose. In this building is a metal refining reverberatory furnace which has been built under the supervision of Ralph Parish, metallurgical engineer, and in this furnace will be refined the metal from the reclaiming plants of both No. 1 and No. 2 plant casting shops as well as the scrap copper made in the copper mill.

FIG. 8—A VIEW OF THE GENERAL OFFICES OF THE STAMFORD ROLLING MILLS COMPANY AT SPRINGDALE, CONN.

THE ORGANIZATION AND THE COMPANY

The executive offices for both plants are housed in a handsome building situated at the Springdale plant. Views of these offices which occupy the space over the shipping room, are shown in Figs. 8 and 9. On this floor also are the chemical, physical and metallurgical laboratories which are shown in Fig. 4.

The executive organization at the Springdale plant includes Harry Wright, vice-president and general manager; William C. McGrath, assistant to the general manager; Max Wright, superintendent of the mill; Frank P. Welton, foreman of the casting shops; Robert Whidden, night superintendent; A. P. Meng, chief chemist; and J. E. Hedgecock is in charge of the brass recovery plant.

At the Stamford plant or Mill No. 2, are Melville K. Weill, assistant general manager, who is in charge; F. H. Wilkie, assistant mill superintendent; D. C. Cowling, assistant superintendent; H. C. Rhèaume, plant engineer and Edwin Peters, foreman of the casting shops. The mechanical engineer of both plants is C. O. Evans and the electrical engineers are Benjamin Offen of Mill No. 1 and E. Stattlen of Mill No. 2.

The Stamford Rolling Mills Company has a capital stock of $2,335,000, of which $2,000,000 is common stock. The officers of the company are Evans R. Dick, president; Harry Wright, vice-president and general manager; E. C. Potter, vice-president; E. T. Shaw, secretary and treasurer. The directors are Evans R. Dick, Dick Bros., Inc., New York, who directs the financial policy of the company; Harry Wright, who is also president of the Consolidated Rolling Mills & Foundry Company, S. A. Mexico, D. F., and has been the man chiefly instrumental in the building up of the present business from the little original German silver plant at Springdale; E. C. Potter, New York, a large real estate operator; A. M. Plyer, Metcalf Brothers & Company, the well-known woolen house of New York and Rhode Island and R. M. Tolin, who is also secretary and treasurer of the Consolidated Mills & Foundry Company. H. H. Smock is general auditor in charge of all accounting, E. M. Franklin is production manager, E. T Cuenin is general purchasing agent and traffic manager, P. F. Head is purchasing agent, and E. K. Wiley is superintendent of stores. The sales office of the company is at 25 Broad street, New York City, and is in charge of R. M. Tolin.

DIE CASTING*

An Address Delivered Before the Chemical Society of the Polytechnic Institute, Brooklyn, N. Y.
By David Lasner

The name die casting is given to a class of finished castings made by pouring molten metal under pressure, into metallic moulds. This method of making castings, which are complete and do not have to be machined down to certain specifications, was introduced in this country during 1735. The first object successfully cast was type, and one now can realize what an aid this was to civilization and the distribution of knowledge. It was only natural that a large amount of experimental work was done with the idea of improving the alloys, the machines, and the dies or moulds, with the gratifying result that the modern die casting machine for type, turns out from 150 to 175 perfect pieces a minute.

The success of casting type led the workers along these lines to try the casting of other objects, with the result that at the present time die castings are being used for the most vital parts of automatic weighing machines, phonographs, cash registers, magnetos, motor housings, time controlling devices, player pianos, water circulating devices, and other apparatus.

After much experimenting the alloys best suited were found to be either of a zinc or tin base, alloyed with copper, antimony, lead, and aluminum, in such proportions as to vary the degree of hardness and strength as was best suited for the particular casting. These alloys may be easily divided into five groups as follows:

No. 1. Zinc alloyed with copper, tin, and aluminum.

No. 2. Tin alloyed with copper, zinc, lead, and aluminum.

No. 3. Tin 60 per cent., zinc 35 per cent. alloyed with copper and aluminum.

No. 4. Lead 80 to 90 per cent. alloyed with antimony.

No. 5. Aluminum 85 per cent. to 92 per cent. alloyed with copper.

Alloy No. 1.—This alloy is somewhat brittle and resembles cast iron. It is generally used for a casting not subjected to sudden shock or strain. On account of its high zinc contents it is a cheap alloy and, being lighter than the tin base alloy, is preferable in many cases.

Alloy No. 2.—This is one of the most expensive alloys, owing to its high tin contents, but this is offset by its great fluidity and low working temperature. Castings difficult to mold or having sharp corners are usually cast from this metal.

Alloy No. 3.—This is really a combination of the first two and the advantage gained by its use is that tin, being more ductile than zinc, can be used for pieces subjected to sudden shock.

Alloy No. 4.—This alloy is used for parts having little or no active work to perform. Owing principally to its cheapness it is used for novelties, ornaments, souvenirs, and toys.

Alloy No. 5.—The great usefulness of this alloy depends on the fact that it is the lightest used in die casting. It is used where great strength and absence of weight are essential. It is, however, a hard alloy to work, due to its high working temperature and shrinkage, causing a large amount of trouble to cast successfully.

There are three kinds of die casting machines which are known as the automatic, semi-automatic, and the hand machines. They vary somewhat in mechanical construction, but the fundamental principle of operating is the same.

The metal is usually heated in a cast iron pot, the temperature being controlled by a pyrometer, and is forced into the die by means of a cylinder and piston. While operating the die casting machine is very simple, considerable experience is required on the part of the operator to attain perfect castings free from blow holes and cracks. For some classes of work it is essential to force the metal quickly into the die, and other times the slow forcing of the metal is best, the variation being governed by the different shapes and the volume of metal. The usual practice is to break a casting and examine it for blow holes (air holes), and when one is obtained that is perfect it is weighed, and duplicates must equal this weight to be considered perfect.

The dies are made from carbon steel, or, where they have to withstand higher temperatures, are made from either Chromium-Vanadium steel or Wolfram steel. They are made in two parts and when correctly made will withstand a large number of impressions, sometimes as much as 100,000 castings being made before the die is considered unfit for use. Many dies are intricate, and exceptional skill is required on the part of the maker. They must be so designed that the metal will flow into all parts and at the same time allow the air to escape. Should the air be held captive, owing to faulty construction, the casting will not be solid, and blow holes or air pockets will result. To prevent this, small grooves are machined into the parting of the die, but if these grooves are too large, fins or ridges are formed on the casting and necessitate the extra expense of filing or grinding.

The saving by having parts die cast depends largely upon the amount of machining that can be eliminated by casting the holes, the threads and the finished surfaces to size. It is possible to make uniform castings to within one one-thousandth of an inch of the desired size.

The field of die casting being so very large, engineers and designers are taking this into consideration where production of apparatus at the lowest possible cost is most essential.

*An exhaustive article on die castings appeared in The Metal Industry, November, 1914.

MANUFACTURE OF SHOT COPPER.

Copper is shotted or granulated at the electrolytic copper refineries for use in neutralizing electrolytes that are too high in acid. The converter copper is poured upon an inclined plane, one end of which leads into a tank of water. A stream of water is directed against the stream of molten copper and upon the pressure of the water will depend the sizes of the shot. The object of shotting the metal is to obtain a large surface so that solution will be rapid. Where it is necessary to weigh copper very accurately, as in the manufacture of gold and silver alloys, copper shot is very useful.

If only small amounts of copper shot are wanted, they may be easily prepared by pouring the molten copper against a shovel that is held over a bucket of water. If the shot is slightly discolored or oxidized, the oxide can be easily removed by the use of a weak pickle of sulphuric acid.—J. L. J.

MEASURING THE OHMIC RESISTANCE OF PLATING SOLUTIONS

AN ARTICLE OF INSTRUCTION IN THE USE OF THE WHEATSTONE BRIDGE BY THE ELECTRO-PLATER

WRITTEN FOR THE METAL INDUSTRY BY C. W. HEIL, FOREMAN PLATER.

Measuring the resistance of an electrolyte with a wheatstone bridge may sound like a difficult proposition and when reading the method as it is explained in technical books it is bewildering, yet in the opinion of the writer a plater who understands Ohm's law and uses electricity every day making the necessary connections for its use would find it easy to use a slide wire wheatstone bridge after giving it a little study.

He probably would at first ask, "Is it of advantage to know the resistance of my solutions, or is it only an interesting experiment?" The writer would answer the more you know about your solutions the less you will work in the dark, and the more you take note and tabulate existing conditions when noting results the more you will know about tomorrow's plating.

The method of measuring an unknown resistance used by the writer is not only simple; that is, containing nothing a plater should not readily understand, but is quickly accomplished. When the bridge is once connected a measurement can be taken and calculations made in two minutes. When the electro-chemist measures the resistance of an electrolyte he uses platinum electrodes in his conductivity cell which is merely a glass container which holds a quantity of the solution of unknown resistance.

His electrodes are one square centimeter in area and he bases his calculations on one centimeter cube of solution. This requires much calculation to put it in terms which mean something to the man in charge of solutions. The plater figures his anode and cathode in square feet of surface and usually places his cathode six inches from the anodes. So, to grasp its meaning he should know the resistance of one square foot of solution six inches long. This can be accomplished by making a conductivity cell which measures the resistance of one square inch of solution 6 in. long using electrodes of the metal in the solution to be measured. Secure a glass tube 1⅛ in. inside diameter about ten inches long. If it is desired to measure the resistance of a nickel solution place two nickel electrodes (or electrodes of another metal plated with nickel) in this tube six inches apart. The electrodes should nearly fill the tube and with conductors on the outside leading to suitable connections. (Diagram will show how these electrodes can be held in position.) The tube thus fitted up is to be lowered in a hydrometer jar filled with the solution of unknown resistance so that solution will come above both electrodes. Care must be taken not to leave bubbles on the electrodes.

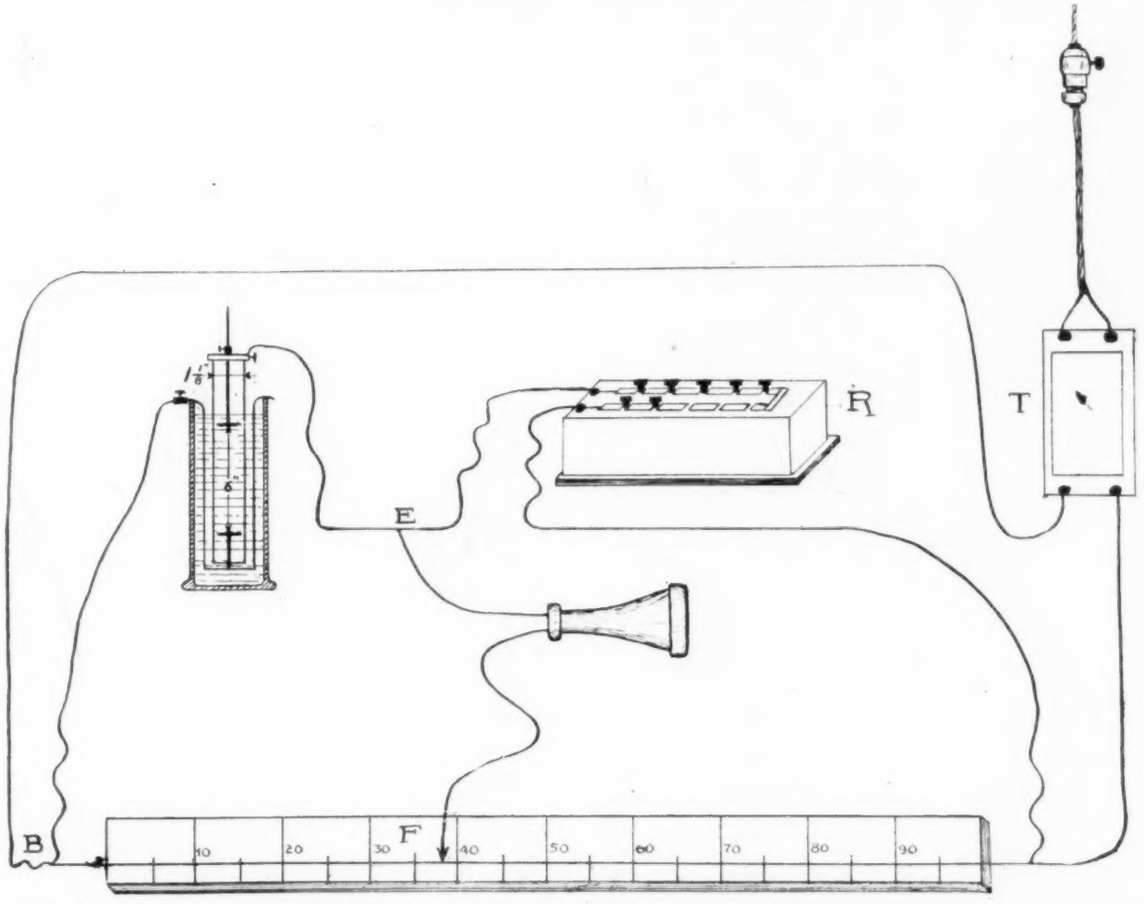


FIG. 1.—DIAGRAM SHOWING ARRANGEMENT OF THE APPARATUS FOR TESTING OHMICRESISTANCE OF PLATING SOLUTION.

The column of solution between the electrodes will be one square inch sectional area 6 inches long. From the resistance of one square inch of solution the plater can calculate the resistance of one or any number of square feet of solution the same length. A nickel solution of good conductivity 80 degrees F. has a resistance of 46 to 50 ohms measured on a column one square inch x 6 in.

long. A plater properly equipped to measure the resistance of his solutions could quickly locate unnecessary resistance in his tanks before adding a quantity of conducting salt when not needed

A good electric cleaner has a resistance of 20 ohms. Suppose some one advises the use of a certain chemical compound and after mixing a quantity of said compound he finds it has a very high resistance and refuses to contaminate his bath with it. If his solutions lack metal he adds salts of the metal and then measures the resistance and adds conducting salt if needed. In brass and bronze solutions the voltage, current density and temperature have much to do with the color of the deposit. In the opinion of the writer measuring the resistance of these solutions would be scientific management when adding sodium carbonate as a conducting salt. Measuring the

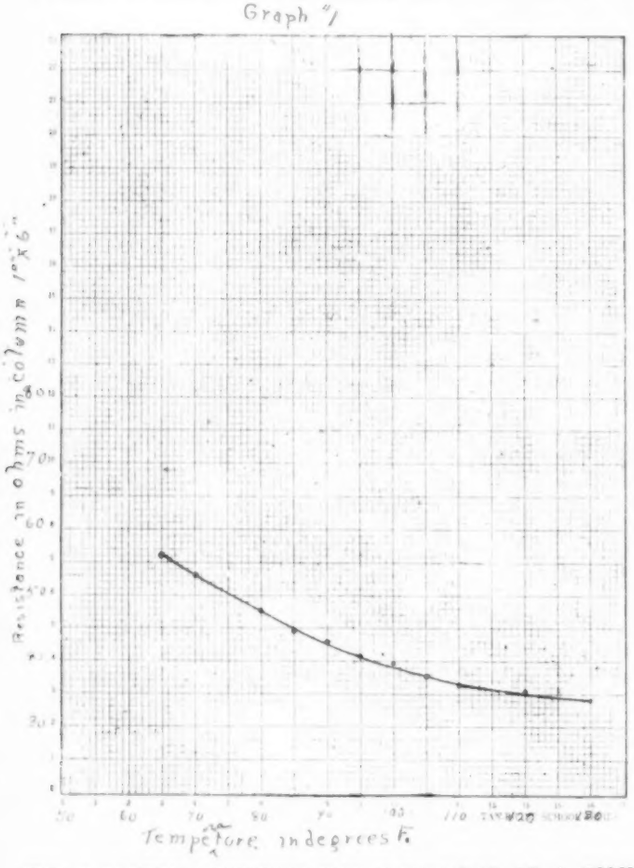


FIG. 2.—DIAGRAM SHOWING HOW RESISTANCE OF A SOLUTION DECREASES WITH A RISE IN TEMPERATURE.

ohmic resistance of an electrolyte is accomplished by the use of a wheatstone bridge in connection with the conductivity cell just described.

The wheatsone bridge itself consists of a resistance box, a slide wire bridge and a telephone receiver. The resistance box contains coils of known resistance ranging in size from .1 ohm to 40 ohms. It is fitted with plugs which short circuit the coil beneath it so that when a plug is pulled that coil is in the circuit and the number of the coil must be considered in the calculation. The slide wire bridge is an alloy resistance wire of uniform resistance stretched over a meter scale. The actual resistance of wire does not enter into the consideration since it is of uniform resistance and only the ratio of the two parts is required. The telephone receiver is used to detect small currents. Since an alternating current is used a galvanometer would be useless. A direct current cannot be used to measure the resistance of an electrolyte because a counter electromotive force is set up between the electrodes which opposes the line current and must be overcome before current will flow. For this reason, an alternating current of high frequency is used which breaks up this counter electromotive force with each alternation and current will flow according to Ohm's law. A 110-volt lighting circuit is usually available and the voltage is easily stepped down with a transformer. A common bell ringing transformer can be purchased at small cost, and will supply a current at 8 volts pressure. This is a safe proposition, as a bell ringing transformer can be shorted for hours without danger.

The diagram Fig. 1. shows the arrangement of the apparatus. Connection is made by plugging in a 110-volt light circuit at S. The voltage is stepped down to 8 at

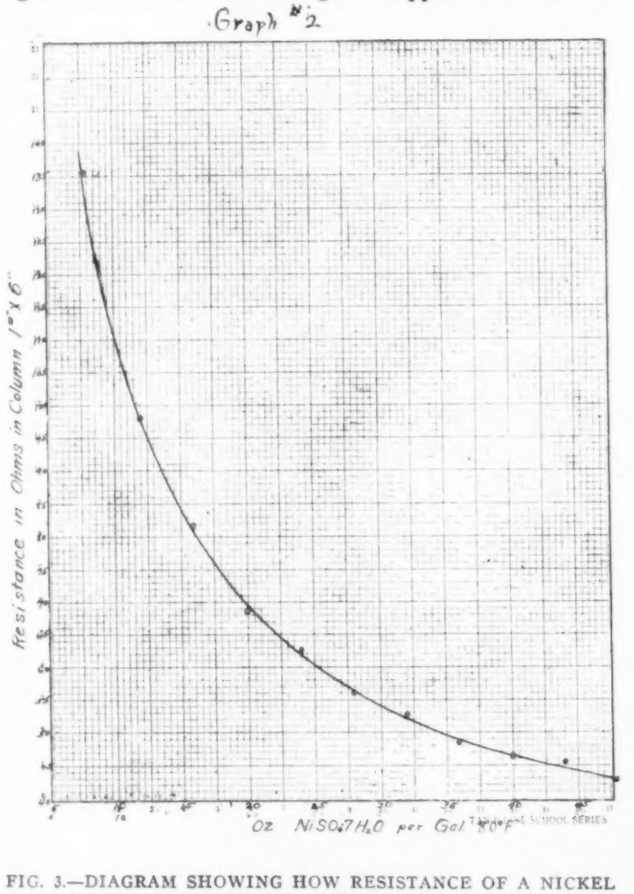


FIG. 3.—DIAGRAM SHOWING HOW RESISTANCE OF A NICKEL SOLUTION DECREASES WITH CONCENTRATION.

the transformer T. The current flows between A and B in two circuits. One is through the conductivity cell C filled with the solution of unknown resistance and the resistance box R. The other path is through the slide wire bridge. One side of the telephone receiver is connected between the conductivity cell and the resistance box at E and the other side is used as a sliding contact on the slide wire bridge. This point is marked F. Telephone receiver serves to determine when contact is in such a position that no current flows between E and F. To make a measurement adjust the resistance R by pulling plugs until a position can be found on the slide wire when no current will flow through the telephone receiver. We will say, for example, that one 40, one 25, a 10 plug have been pulled; then total resistance of box R in the circuit would be 75 ohms. By use of the sliding contact a point is found on the slide wire bridge where no current flows

through the telephone receiver and when held to the ear gives forth a minimum sound. We will say that this point is found at 38. The ratio of this arm of the bridge which is 100 spaces long is 38 to 62. The calculation is then an example in proportion: 38 : 62 : : X : 75 or 38/62 x 75 equals 45.9. Resistance of X equals 45.9 ohms. Since the resistance of a conductor decreases as the sectional area increases, then 45.9 ÷ 144, the number of square inches in one square foot, equals .318, the ohmic resistance of one square foot of solution 6 inches long.

Another way to connect up the bridge is to make telephone connections at A and B and change the power wire to E and F. This way the noise in the telephone from the sliding contact is avoided.

The resistance of an electrolyte varies inversely as the temperature which is just the opposite of a conductor of the first class or metallic conductor. This variation in the resistance due to a change in the temperature is so rapid that it is necessary to take the temperature of the solution whenever the resistance is measured. It is not specific to say the resistance of a column of solution one square inch sectional area by 6 in. long is 45.9 ohms when the temperature is not stated. A change in the temperature of 10 degrees F. would make a difference of about 6 ohms below 100 degrees F. If a plater would measure the resistance of his nickel solution at different temperatures beginning at 45 degrees F. and take a reading with every increase of 5 degrees in temperature up to 100 degrees F., he would at once become a firm advocate of warm solutions. For example, a nickel solution has a resistance of 43.5 ohms at 75 degrees F. When plating at that temperature and at 2 volts one hour is required to get a good deposit.

This solution is not warmed in winter and the temperature gets as low as 50 degrees F. It then has a resistance of 65 ohms, and if still run at 2 volts, one hour and 30 minutes would be required to get the same deposit, provided other conditions are the same. Since the current is carried solely by the free charged ions in solution, it follows that when the conductivity increases with a rise in temperature, the solution contains more free ions and that the salts in solution have dissociated to a larger degree. In a nickel solution the rate of deposition depends largely on the number of free charged nickel ions present, so it follows that attention should be given to the conductivity of the bath and that a scientific method of measuring its resistance should be used.

Figure 1 will show how the resistance decreases with a rise in temperature. The solution contained 12 oz. nickel ammonium sulphate per gallon of distilled water. The first measurement was made at 65 degrees F. and solution showed a resistance of 56.1 ohms. An increase in the temperature of 5 degrees caused a decrease in the resistance of 3 ohms. At 100 degrees F. solution had a resistance of 39 ohms, showing a drop of 14 ohms caused by an increase of 30 degrees in the temperature.

Above 100 degrees F. a rise of 30 degrees in the temperature only caused a drop of 5 ohms in the resistance. A measurement of the resistance was taken with each raise of five degrees in the temperature of this solution.

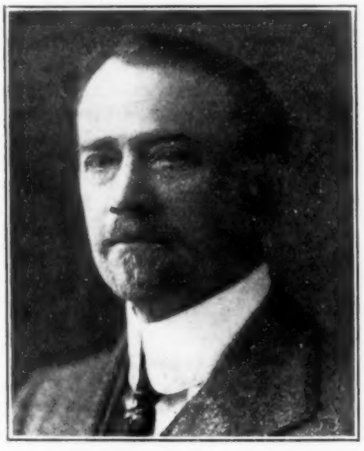
Figure 2 will show how the resistance of a nickel sulphate solution decreases with increased concentrations. All measurements were made at 80 degrees F. and the graph gives a fair idea of the degree of dissociation of the salt with each increase in the concentration. First measurement was made of solution containing 7.8 oz. of nickel sulphate crystals per gallon of distilled water. The resistance was 135.5 ohms. The next solution contained 12 oz. of the salt per gal. and the resistance had dropped to 98 ohms. After this step each increase in the concentration was 4 oz. per gallon and the last solution of 48 oz. per gallon showed a resistance of 43.85 ohms.

An individual solution was carefully made up with distilled water for each step in these measurements. A guaranteed thermometer was used and resistance coils had been carefully tested for accuracy.

The writer only desires to interest other platers in this work, feeling sure it will be a scientific step forward in the electro-deposition of metals. The bridge will be shown at the Electro-platers' convention at St. Louis.

A ZINC COMMITTEE FIXES GOVERNMENT PRICES

The Zinc Committee of the Advisory Commission of the Council of National Defense, appointed by B. M. Baruch, in charge of raw materials for the Advisory Commission, is as follows:



CHARLES T. ORR
President Bertha A. Mining Company.

Edgar Palmer (chairman), president New Jersey Zinc Company; Charles W. Baker, president American Zinc, Lead & Smelting Company; Sidney J. Jennings, vice-president U. S. Smelting, Refining & Mining Company; Thomas F. Noon, president Illinois Zinc Company; M. Bruce McKelvie, president Butte & Superior Mining Company; Charles T. Orr, president Bertha A. Mining Company; C. F. Kelley, vice-president Anaconda Copper Mining Company; A. B. Cobb (secretary), vice-president New Jersey Zinc Company.

The purpose of this committee is to insure the Government its supply of zinc during the war and to secure the co-operation of the zinc producers of the country in taking care of whatever needs may arise. The following prices for slab zinc have been fixed with Government approval:

	per lb.
Grade A	11½c.
Grade B	11c.

SIDNEY J. JENNINGS
Vice President U. S. Smelting, Refining and Mining Company.

The price of grade C is protected against decline.

Grade A must be free from aluminum and contain not over .07 per cent. lead, .03 per cent. of iron and not over .05 per cent. of cadmium. Grade B must not contain more than .50 per cent. impurities while Grade C must not contain over 1.20 per cent. of impurities. The above prices are in carload lots with freight allowed to New York points.

DEVELOPMENT OF AN ALKALINE SUBSTITUTE FOR THE COPPER CYANIDE SOLUTION

RESULT OF AN INVESTIGATION INSPIRED BY THE HIGH PRICE OF CYANIDES.

WRITTEN FOR THE METAL INDUSTRY BY C. B. WILLMORE, ELECTRO-CHEMIST.

Several months ago*, in making a few suggestions which I hoped would assist somewhat in relieving the difficulties due to the scarcity of cyanide, I remarked that I had had some experience with an alkaline copper solution which does not necessarily contain cyanide, which has been successfully used to copper plate on iron and steel, and which has some of the properties of the copper cyanide solution and a few advantages over it. Since that time there have been so many inquiries concerning the formula for this solution and its manipulation, that an article on the subject would seem to be worth while.

Before proceeding with my subject, I wish to anticipate, if possible, some of the criticism with which articles of this kind are often met. A substitute is often more or less of a makeshift. To expect a substitute to have all of the good properties and none of the bad features of the standard article, and to expect the substitute to stand up under all manner of ill treatment which one would not think of according the standard is obviously unfair. The purpose of a substitute in nearly every case is to save money, either to replace a more expensive article, to produce a better product at the same expense, or to replace something which has become very difficult to obtain. In either case there will be a distinct gain to the user if the substitute can be made to work, and for the sake of that gain he should be willing to spend a little time in learning the peculiarities of the substitute. In many cases, he may even find it to his advantage to accept a slightly inferior result, or to go through an extra operation or two, if that be found necessary.

In all fairness, one should not expect a new article to do more than is claimed for it; if it lives up to its purpose of saving money while producing an acceptable result, then its use is certainly justified, and nothing is to be gained by attempting to make it do work for which it was not even remotely intended. To object to a new copper solution because the deposit has not the tensile strength of steel, the non-corrosive properties of gold and platinum, and the lustre of a bright nickel deposit, argues for a small field of vision on the part of the critic, and yet the present copper bath has met with just such criticism from persons of supposed intelligence and education.

SEARCHING FOR SUBSTITUTES

In attempting to find a substitute for an article already in use, there is one method of procedure which seems to me to be more logical and usually more efficient than other methods which might be used to accomplish the same result. First study the material already in use from every angle, to find out just which of its properties are responsible for accomplishing the effect aimed at in using it. Then consider all the known materials which possess these essential properties or similar ones. Sometimes two materials possess the necessary properties between them, and when used in the proper sequence or combination may be quite successful. Further, it is not always necessary that a material have all of the qualities, as we may possibly be mistaken in determining just what properties are absolutely essential. At the same time, one should not lose sight of the fact that it is very important that the new material should be cheaper than the old one. Having thus determined upon a number of possibilities, the next thing to do is to try them out on an experimental scale, starting with the one which is the cheapest, or for any other reasons most desirable.

The process of finding a substitute is not always as difficult as might be imagined, for very often a few minutes of intelligent consideration along the lines just indicated will give you the "hunch" to try out a material which proves to be exactly what is wanted.

In making the tryout of the material, however, one should bear in mind that the conditions of usage largely influence the results obtained. A material which is entirely successful under the proper conditions, may be a fizzle from every standpoint when the conditions are changed. Hence, one should be sure that he gives his proposed substitute a fair trial over a somewhat wide range of temperature, concentration, voltage, current density, etc.

A material which could be used as a substitute for cyanide in every case does not seem to be in sight. However, for many of the special uses of cyanide, substitutes for each special purpose can be found. A few of these substitutions are: the use of dilute muriatic acid, or ammonia, for removing stains from metals; the use of the chlorination process instead of the cyanidation process for extracting gold from ore; the use of other carbon bearing materials, such as barium carbonate, leather meal, calcium carbide, etc., for case hardening.

In the cyanide copper plating solution, we have a strongly alkaline solution, which is fairly stable, in which copper is extremely soluble, and iron is not, and from which copper cannot deposit on iron by immersion. This latter fact is extremely important, as it permits the direct deposition of copper on iron. The reason the cyanide solution does not deposit copper by immersion on other metals than iron, is because the single potentials of most metals in cyanide solutions are below that of copper. In the case of iron, this is true also; but even if iron were above copper in potential, copper would not deposit on it by immersion because iron is practically insoluble in most alkaline solutions.

Thus by a consideration of the essential properties of the copper cyanide solution, we can narrow our efforts for finding a substitute down to a quest for a solution which is alkaline, which dissolves copper readily, and which does not readily decompose.

VARIOUS POSSIBLE SOLUTIONS

There are three solutions known which appear to possess these essential properties. One is the ammoniacal solution, produced by adding ammonium hydroxide to a solution of a copper salt, first precipitating copper hydroxide, which upon the further addition of ammonia, changes to a clear deep blue solution. Under certain circumstances, this solution gives reasonably good deposits, but several difficulties are met with: the anode corrosion is not entirely satisfactory, as a basic green slime is formed over the anodes; upon copper and brass articles the deposit is fairly good, but the solution attacks iron, so that an adherent deposit cannot be produced; furthermore, the solution is not sufficiently stable for commercial work, as the ammonia constantly volatilizes.

Another possibility is the solution of copper tartrate in caustic soda. This solution has for a long time been used as a reagent in analysis, for determining the amount

*THE METAL INDUSTRY, January, 1917.

of dextrose, or grape sugar, in various organic materials. It is made up by mixing together certain proportions of copper sulphate, caustic soda, and sodium-potassium tartrate, commonly known as Rochelle salt. In appearance, it strongly resembles the ammoniacal solution of copper, being a deep, clear blue. In addition, it is strongly alkaline, it dissolves copper quite well, and under the proper conditions is quite stable. Furthermore, copper can be deposited from this solution in a satisfactory form, and the solution can be made up, if desired, to a high metallic concentration. It is this solution which is about to be described in the present paper.

The third solution which might be used is similar to the above, as it consists of a similar mixture of caustic soda, copper sulphate, and glycerine. The solution looks and acts very much like the above, but is more expensive to make up, and while the deposit from it is quite good, it stains more easily upon removal from the bath.

The solution of copper tartrate in caustic soda is the one which holds out the greatest promise. One form of this solution, known as the "Weil" bath was at one time used for plating by "contact," that is, articles to be copper plated were suspended in the bath in contact with pieces of metallic zinc. The combination formed a galvanic couple, wherein a current flowed from the zinc, through the solution, to the article being plated, thereby causing copper to be deposited upon the article and zinc to go into solution. When the bath became too heavily loaded with zinc to work properly, it was thrown away and a new one made up. So far as I am able to discover, this solution was not used for copper plating by the use of outside current.

The solution which the author has found to give the best results is as follows:

Copper sulphate	8 oz.
Rochelle salt	11 oz.
Caustic soda	8 oz.
Cyanide	½ oz.
Water	1 gal.

The one-half ounce of sodium cyanide given is to be looked upon as being more in the nature of an "addition agent" than as an essential constituent of the solution, as the solution will operate very successfully without it. Tests have shown that the effect of this small amount of cyanide will last almost indefinitely, without the necessity of any further addition for a considerable length of time.

In making up this solution, dissolve up the three main constituents separately first, and allow the caustic soda solution to cool. Then add about half of the caustic soda to the Rochelle salt, add all of the copper sulphate to this mixture, and finally add the rest of the caustic soda and the small amount of cyanide. The solutions should be poured together somewhat slowly and stirred well to avoid the formation of very large clots of copper hydroxide. Unless a certain amount of care is taken to cool the caustic soda first, and to stir the solution well while mixing, some of the copper may be precipitated later as a red cuprous oxide, forming a sludge at the bottom. As thus prepared, the solution is a very deep blue in color, perfectly clear, strongly alkaline, and exceedingly corrosive to the skin. It is well to have a solution of boric acid, or weak sulphuric acid handy to apply to the hands in case any of the solution gets on them.

No heat should be applied to the solution after it is made up, as prolonged or excessive heating will cause it to decompose slowly. Copper carbonate can be used for making up the solution, if desired; but there is nothing to be gained and the carbonate is somewhat more difficult to dissolve.

If there is any sediment in the bath after making it up, it will be well to allow it to settle for a day or so and then syphon off the clear liquid. Ordinary felt or fine muslin filtering media do not answer satisfactorily, as this solution is a pretty good solvent for them; but a useful filter can be constructed by placing sheet asbestos on a support of fine wire screening.

As with all other plating solutions, it is the regulation of the working conditions which has the most to do with the success or failure of the solution. The tartrate solution may seem a little more "finicky" to handle at first than most of the plating solutions. The main trouble with most platers in running this solution will be that they will try to run it by the same methods they use for either copper cyanide or copper sulphate baths. If the following directions are intelligently carried out, however, there should be very little difficulty encountered.

First and foremost, there must be adequate anode surface. This means that there must not only be sufficient anodes hanging in the tank, but that each of the anodes must have good electrical contact with the anode bar in order that it will carry its full share of the current. This precaution is particularly important with the tartrate solution, for reasons which shall soon be made apparent.

Under the best conditions of the solution, the current density at the anode may be safely allowed to run as high as nine or ten amperes per square foot, and with the slight addition of cyanide it may be higher; under average conditions it is best not to exceed six or seven amperes. With current densities below this limit, the anodes dissolve freely and present a clean appearance, even during the passage of the current, resembling in this respect the anodes of the acid copper solution. During passage of the current, there may be seen upon close observation, a cloudy, light blue or green precipitate streaming away from the anode and dissolving into the solution. This condition is an indication that things are as they should be.

MAINTENANCE CONDITIONS

To maintain the correct current density, a pressure of about one and one-fourth, to one and one-half volts only, is required, owing to the high conductivity of the solution. Without the presence of a small amount of cyanide in the solution, when the critical current density is exceeded, the anode begins to coat over with a light brown oxide, beginning at the bottom and edges and spreading over the entire surface; this light brown color gradually becoming darker and finally almost black. At the same time, the voltage required to maintain this current density is sharply increased by one or two volts. In this condition, although the solution still deposits perfectly well, the anode corrosion is next to nothing,—to use a common term, the anode has become "passive." Upon lowering the current density, even to one ampere per square foot, the anode still remains passive, retains its dark brown coating and offers considerable opposition to the passage of the current. The condition persists even after allowing the anode to stand in the solution without use for several days. The only way to clean up the anode is to remove it and dip it into a weak pickle of sulphuric acid, or even ammonia. This removes the coating very quickly and the anode is then as good as ever.

The above described condition of passivity of the anode is the chief objection to the use of the tartrate solution without the addition of cyanide. Even so, when properly used, this solution will operate quite successfully without any trouble. However, the addition of the small amount of cyanide raises the critical current density to a much higher figure, and makes the solution almost fool proof. The passivity still occurs, though at a much higher current density; but it does not persist when the solution is allowed to stand without use.

It must be observed that unless all of the anodes are included in the electrical circuit, the burden of the load will fall on those anodes which are included in the circuit, and there is danger of these anodes carrying so much that the current density will run up above the safe limit. Under such conditions in the absence of cyanide a few anodes may become coated over and refuse to work properly, throwing part of the load off onto the remaining ones, which then causes them to be overloaded and to coat over. Once this process is started, it progresses quite thoroughly until the anodes get into such condition that they do not feed metal into the bath, and the bath becomes impoverished of metal. So it is seen that in this case a little care taken to keep things working right will save a great deal of trouble in the long run, which is more or less true of any plating solution.

One can tell very quickly from the voltmeter readings when the above described condition has taken place, as the voltage almost immediately commences to rise. Upon observing such a rise in voltage, one will save himself the most trouble if he will immediately shut off the current and fix up his anodes. Usually if the high current density is not allowed to obtain for too long a time, simply reducing the current will be sufficient to depolarize the anodes. This is particularly true when cyanide is present.

(To be continued.)

WAR AND BRASS MANUFACTURING INDUSTRIES

SOME REASONS WHY THE COUNTRY SHOULD CONTINUE TO BE PROSPEROUS.

WRITTEN FOR THE METAL INDUSTRY BY P. W. BLAIR, MECHANICAL SUPERINTENDENT.

The entry of the Untied States into the European war, coupled with the five billion dollar war fund, is going to have some effect on business. Events of such moment cannot fail to exercise marked influence on the every-day life and activities of the American people. What will be the consequence, from the standpoint of the brass industry and trades that are closely affiliated with them?

First of all, of the more pronounced influences that war may be expected to exert will be the elimination of much extravagance and wastefulness on the part of the whole people, a sobering influence that will lead the average man to make a serious effort to adjust his expenditures in proportion to his income. The savings banks should prosper and high-grade income-producing securities should enjoy an active demand. Speculative enterprises, on the other hand, are apt to have difficulty in getting money.

Funds for real estate improvement projects of sound character are sure to be plentiful and interest rates low, for the first year of our participation in the war, since in the next twelve months our war expenditures cannot possibly equal our war profits of the last two years. The proposal to lend a tremendous sum to the Entente Allies at three and one-half per cent.—a rate lower than their own internal loans have carried—is gratifying evidence that American financiers are not troubled about the possibility of a tight money market in the near future.

Under these conditions the brass manufacturers' business should be active, and would be but for one adverse factor—the generally prevailing impression that metal and manufacturing costs are excessive. That impression grows out of a comparison of present costs with those of the period before the European war began, and ignores entirely the shrinkage in the purchasing power of money that has come about since 1914. Indications at the present time show no signs of returning to low prices.

A man will tolerate paying a 100 per cent increase in the price of potatoes or theater tickets and will continue to buy. But when he discovers a 25 per cent increase in the cost of metal, he will defer from buying on a large scale unless he is convinced that there is no reason to look for lower prices within a reasonable time. So the relevance of an inquiry into the probable future of material and labor costs is apparent. Can they be expected to return to the low levels that prevailed three years ago? The first factor, of course, is labor. Wages have increased in every industry and it is certain they cannot be reduced without an economic upheaval of extraordinary proportions. The tendency to want a shorter working day is generally approved and every one knows that it carries with it a higher wage rate. It is extremely unlikely that any development of the next few years will reverse public opinion in this country to a point where it will tolerate a sacrifice or annulment of the improvement that has been brought about in the condition of workers of the nation.

Transportation costs, potentially at least, have increased along with the labor costs. The railroads have not received all the rate increase they sought, but the trend of public sentiment is toward a more liberal policy and there is little doubt of the imminence of still higher freight.

In the brass manufacturing trades these factors, high labor and transportation costs, are things to be supplemented by an extraordinary demand during the term of the war, due to the large amount of metal used in the manufacture of munitions. Large buyers of metals are almost unanimous in looking for higher rather than lower prices.

An acute shortage of labor now exists in the United States and no source of relief is in sight, for the going of our men for military and naval services will make it worse. We cannot draw on Europe now, or after the war, as they will need every able-bodied man for work at home. For many years the industries of the United States have depended on an annual addition to our unskilled labor supply that is now cut off altogether, and it is probable that the opportunities in Europe, when reconstruction begins, will be so great as to stem any tide of emigration to America that might develop under any other circumstances.

The brass manufacturing industries preparations are under way for our real entry into world trade when peace comes. Foreign business is now financially possible, with our banking and monetary system revamped to meet its requirements. The building up of a great export business will tend to lessen internal price-cutting competition and will go far toward standardizing the values of the products of the brass manufacturing concerns. And so it is possible to go on and recount a multitude of reasons for the declaration that all prices are normal at the present time.

It is a well known fact that people are going to have plenty of money and are going to tend toward investing it rather than merely spending it. If they can be made to see that the really pertinent comparisons of costs is with the future rather than the past, business cannot fail to take on greater activity. Every brass manufacturing concern owes itself the duty of looking to the future and forgetting the past, and to prepare for a period of high tension and less activity, which is bound to come.

A PLATER'S RECOLLECTION

SOME SERIOUS INFORMATION REGARDING THE FINISHING OF METALS TOLD IN BREEZY STYLE.

WRITTEN FOR THE METAL INDUSTRY BY JOSEPH BIRBAUM.

(Continued from February.)

MOTION PICKLING

We have taken up tumbling and troubles caused through incorrect loading and pickling, but once more before proceeding to ball burnishing, a process of mass buffing, we will return to the previous theme of tumbling and pickling.

The present high cost of platers' supplies has brought many substitutes on the market, some valuable others worthless. Acids as used for pickling have not escaped this rise in cost and the plater is more and more compelled to make "economy" his watchword throughout.

Sulphuric and muriatic acid, the factors most commonly employed for pickling, have found a most worthy competitor in the acid salt or nitre cake (acid sodium sulphate), a residue derived from the manufacturer of nitric acid which, heretofore, the acid or explosives producers have not been able to profitably dispose of, but which is now sold at a very low price. This acid sodium sulphate contains, of course, low acidity and does not remove ferrous scale in a cold solution but attacks the black oxide with surprising rapidity when kept near the boiling point. Nitre cake dissolves the black oxide and has very little effect on the iron and possesses, therefore, a great advantage over the customary pickles, as it automatically avoids overpickling. This peculiar property of this residue salt of not only attacking the scale but practically holding the metal immune, has in many instances brought about a complete elimination of pickling as a separate process. Although the steam and vapors arising from a hot salt cake pickle are not as dangerous and harmful to the operator as those of hot sulphuric acid pickles, still men have been subjected to vomiting spells therefrom. Also the high temperature of the pickle baths from 180 to 200 degrees F., under which this pickle works at top speed and pickling all day do not make this a job to be envious of, although for safety and health reasons it is a big improvement over the old acid pickle. Nevertheless, it has been difficult to retain men for any length of time at this kind of work, and it was only natural that everybody connected with such work searched their minds for a modern up-to-date equipment which would eliminate the nasty features of the average pickling room.

Sandblasting in its various forms certainly is an ideal way to remove sand and scale, but unfortunately it could not be applied practically and economically in this instance. The mechanical department was taken into consultation and after due consideration plans were made to install hoists and air pressure systems to draw off the bath and force it back into the tubs. However, an equipment of this kind curtails considerable expenditure and it was left to a chance remark to put a stop to the whole plans.

Shocks! Why not do away with pickling entirely? This was the spark to set a formation of a new combination of concepts agoing by combining water tumbling and pickling by means of nitre cake, and the whole process was simple, so very simple that it is really astonishing this was not thought of before; but then let us get down to facts.

We have previously been told that a salt cake pickle will not attack the metal proper very readily, less so in a cold state. Also that excellent, clean and rapid tumbling can be done in the wet or water tumbling method and so shortly after the birth of this idea a trial took place which four hours later revealed work as free of scale and bright as the best cold rolled material. The ordinary charge used per gallon of water for a still hot nitre cake pickle is about one pound, or less than one-half cent per gallon, whereas a one to eight part sulphuric acid pickle cost approximately two cents per gallon. However, in motion pickling a still greater reduction of materials besides a total elimination of pickling labor cost can be accomplished in as much as fully 2,500 square feet of material can be cleaned at a cost not to exceed fifteen cents.

Any good water tight tumbler is all that is required, but it should be of strong construction to withstand possible gas pressure which will form during the oxide dissolving period, or should be equipped with a safety vent through which the gas will discharge. This is not absolutely essential and can well be omitted if the operator exercises care when removing the cover. This is best done by loosening slowly the cover bolts that are furthest away from the operator first, so that should there be a discharge of gas it will not strike the operator, but go in the opposite direction.

In motion pickling and subsequent tumbling the same rule holds true in regards to loading as previously taken up. Where work is running and which has a tendency to nest, fill the barrel to the top, set the cover in place and run 10 to 15 minutes. If, upon opening, the bulk is reduced too much, add more work until the tumbler is filled about four-fifths as no other material is added later on which takes up space more can be loaded in the wet than the dry tumbler. This is done to avoid burring and damaging of the goods. Secondly, put nitre cake on the work to be treated, use from 10 to 30 pounds per 100 gallons of water, but this will depend upon the class of work and the thickness of scale covering it. Then fill with water, for pickling. It is not necessary to have the articles completely submerged in this solution, as a half filled barrel will nicely do the work, for by rolling, the articles are continually being immersed in the pickle. Clamp the cover on tight, which, by the way, should have a rubber manhole gasket, throw the drive clutch in, and after 2 to 5 hours see how nice the charge is pickled and cleansed without any extra handling. Should the article after inspection be satisfactory, then set a perforated cover in place of the solid cover, start the tumbler and run until all the pickling solution is discharged, stop and put from 10 to 30 pounds of soda ash in the barrel, fill with water until all the work is completely submerged, put the solid cover on and run to suit needs. For the average work from 10 to 15 hours ought to be sufficient to turn out a first class and bright job.

(To be continued.)

BRIGHT DIP FOR COMPOSITION.

The grey film found upon the surface of "bright dipped" sheet brass and composition is lead sulphate and is very hard to remove.

Bright or matt dips, that are intended for use upon brass composition containing lead, should be made up without sulphuric acid.

Plain nitric acid, cautiously diluted to the working point, will give very good results. Somewhat better results will be obtained if two ounces of strong acetic acid is added to each gallon of the diluted nitric acid.

E. M. G.

EDITORIAL

Vol. 15 NEW YORK, JUNE, 1917 No. 6

THE METAL INDUSTRY

With Which Are Incorporated
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER, THE ELECTRO-PLATERS' REVIEW, COPPER AND BRASS.
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SELECTIVE DRAFT

By next September we are told the selective draft will be fully enforced and the first increment of 500,000 men will be drawn and placed into training. There is already evidenced in manufacturing interests, as shown by the letters from correspondents in the TRADE NEWS columns of this issue of THE METAL INDUSTRY, anxiety as to the effects the draft will have on their organizations. It is certain, of course, that a great many men will be drawn by draft from the operative classes, but we do not believe it will be the purpose of the War Department to in any way cripple the metal manufacturing industries; or in fact any industry that produces anything that will be of service to the nation or nations at war. The experience of England is too well known not to have its effect in the conduct of the draft in the United States. Any indifference to or disregard to the retarding or slowing down of any industry such as munitions, clothing, shoes or any of the pursuits essential both to the welfare of soldiers or sailors would cause a serious hindrance to the prosecution of the war.

We believe the purpose to so carry the draft as to cause as little confusion and interruption as possible is clearly reflected in the recent proclamation of the President on the subject of the draft. He said:

"The men who remain to till the soil and run the factories are no less a part of the army that is in France than the men beneath the battle flags. It must be so with us. It is not an army that we must shape and train for war; it is a nation. To this end our people must draw close in one compact front against a common foe. But this cannot be if each man pursues a private purpose. All must pursue one purpose. The nation needs all men; but it needs each man, not in the field that will most pleasure him, but in the endeavor that will best serve the common good. Thus, though a sharpshooter pleases to operate a trip-hammer for the forging of great guns and an expert machinist desires to march with the flag, the nation is being served only when the sharpshooter marches and the machinist remains at his levers."

It is evident then that there will be a place where every one can do his "bit" and he will be just as important in the scheme of things whether he is in the trenches, on a ship, in an aeroplane, in the machine shop, in the mill or in a foundry. It may be that there will be some plan devised whereby the worker in the humbler field may become just as much in evidence as his brother who appears now and then with the outward sign of his service in the shape of a uniform.

UNPREJUDICED DISCUSSION

For the stand taken by THE METAL INDUSTRY in the matter of the discussion relating to Boron Products now being sold by the American Boron Products Company no defense is necessary. The columns of this paper in accordance with its established policy are open to any one who has anything to say that is of value or interest to the field covered by THE METAL INDUSTRY. It is not the purpose or desire of this paper to describe in its text or exploit in its advertising columns products or methods that are proved to be the opposite of what is claimed for them. THE METAL INDUSTRY assumes a perfectly impartial attitude and believes a person (or abstract article) innocent (or worthy) until proven guilty (or worthless).

THE METAL INDUSTRY does feel called upon to defend itself, however, from the charge of having committed a "brilliant blunder" (whatever that may be!) made by the American Boron Products Company in its May advertising. In the first place the practice of publishing a letter or criticism in the name of an unknown, the public, is perfectly proper and is repeatedly done. All that is necessary is for the publisher of the journal to know the identity of the author and that he is responsible and sincere in his criticism. So we can truthfully say that "Veritas" is *not* unknown. In the second place the advertisement of the Boron Company headed BORONIC LACONICS is as LACONIC of proof as its title.

The comparison of copper in steel with boron products we believe to be immaterial and irrelevant for no one ever disputed the presence of copper in the steel; but we have published a half dozen letters stating that there is no boron in boron-products. THE METAL INDUSTRY believes that there is still room for discussion.

EDITORIAL CONFERENCE

On Friday, May 25, 1917, an Editorial Conference was held in the Cabinet Room, New Willard Hotel, Washington, D. C. This Conference was attended by editors of business papers from all over the United States. The object of the meeting was TO PROMOTE THE MORE EFFECTIVE USE OF THE BUSINESS ENERGIES OF THE COUNTRY BY A CLOSER CO-OPERATION OF THE BUSINESS PRESS WITH THE GOVERNMENT.

The conference was addressed at length by the following: Dr. Pearson, president of Iowa State College, who spoke in the absence of Secretary Houston of the Department of Agriculture; William C. Redfield, Secretary of Commerce; F. H. Vanderlip, president of the National City Bank, New York; Hon. Josephus Daniels, Secretary of the Navy; Hon. Franklin K. Lane, Secretary of the Interior; Hon. Newton D. Baker, Secretary of War; Hon. William B. Wilson, Secretary of Labor; Dr. Van H. Manning, director of the United States Bureau of Mines; Herbert C. Hoover, Food Administrator; Walter Gifford, Director of the Council of National Defense; Frank Scott, chairman of the munitions board of the Council of National Defense; Dr. Franklin H. Martin, in charge of Red Cross Work, Medicine and Sanitation, Council of National Defense; George Creel, chairman, Committee on Public Information; Hon. Howard Elliott, member of the Executive Committee of the Council of National Defense; and Louis B. Franklin, who is in direct charge of the distribution of the liberty loan bonds.

ELECTRO-PLATERS' CONVENTION

As will be seen from the opening pages of this issue of THE METAL INDUSTRY preparations are about completed for the 1917 Convention of electro-platers at St. Louis, Mo. This will be the electro-plating event of the year, and the time, July 5 to 7, is a happy selection, as it will enable delegates and others attending the convention to include the 4th in what will be a most pleasant vacation. There are two duties for the plater to perform, read the account in THE METAL INDUSTRY, and then go to St. Louis!

CORRESPONDENCE AND DISCUSSION

WE CORDIALLY INVITE CRITICISMS OF ARTICLES PUBLISHED IN THE METAL INDUSTRY

NEW BOOK

Compressed Air for the Metal Worker—by Charles A. Hirschberg. 8½ x 5½ inches. 322 pages, including index. 294 illustrations. Bound in fabrikoid. Published by the Clark Book Company, Inc. Price, $3.00. For sale by THE METAL INDUSTRY.

The industries in the metal working field served by compressed air are many and varied; for instance, among these may be mentioned the machine tool builders, manufacturers of metal machinery, ammunition and fire-arms manufacturers, automobile manufacturers, electrical manufacturers, hoisting and conveying manufacturers and structural workers. The book aims to tell how and why and theory, when referred to at all, is discussed concisely and in non-technical language, and it is believed that this work will be found particularly valuable. The subject treated, compressed air, has been divided into six heads as follows: power plants, foundries, machine shops, forge shops, boiler and structural shops, and miscellany, and from the careful perusal of the book we have no hesitation in recommending it most strongly to any present or prospective user of compressed air.

NICKEL SILVER

To the Editor of THE METAL INDUSTRY:

The writer is wondering if you would not agree with him that the present would be an appropriate time for all of us in the electrical and metal business to give consideration to the adoption of the name "Nickel Silver" or "Zinc Silver" as a replacing name for the so-called German Silver. Action of this sort has been taken in England, and obviously it would be in order for us to do likewise.

A. W. HARTIGAN, Sales Manager,
Electrical Alloy Company, Morristown, N. J.
May 11, 1917.

[We have referred our correspondent to the editorial on the above subject which appeared in THE METAL INDUSTRY for March. We believe that what was said there covers all that we have to say on the matter, and we are hoping that the subject will come up at the 1917 convention of the American Institute of Metals in Boston, Mass., next September. THE METAL INDUSTRY would be glad to hear from other of its readers who have any ideas upon this subject and metal nomenclature in general.—Ed.]

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

ASSOCIATE EDITORS: JESSE L. JONES, Metallurgical PETER W. BLAIR, Mechanical CHARLES H. PROCTOR, Plating-Chemical

CASTING

Q.—We have several tons of chilled phosphor-bronze bars to cast in lengths of 1 to 2 feet by 1 inch and 1⅜ inch diameter. The metal is 14/18 tons tensile with 2½ to 5 per cent. elongation. We cast in iron moulds. Our difficulty is that we get many blow-holes and channels on the outer skin of the bars. Can you kindly give us any advice that will enable us to make good sound bars?

A.—The moulds should be carefully scraped free from oxide and rust and thoroughly dried in a stove. A dressing should be applied with a brush or a pad of waste, a suitable dressing consisting of seal-oil and plumbago. All excess should be wiped off, and the mould thoroughly warmed before casting. There is no reason why you should not produce bars free from air-pockets, as the length is not excessive. By making very fine shallow saw cuts in the mould surface forming the joints, the escape of gas and air may be facilitated, whilst a widening out at the top of the mould will facilitate pouring, will give a good head of metal, and make good the shrinkage during solidification. A small bridge of iron placed cross the mouth of the mould will enable the metal to be poured at one side and gas and air to escape from the other. The method of pouring is of the utmost importance. A full, steady stream at first, followed by a gradual slackening in the rate of pouring from middle to top, a thin stream of metal being maintained as the bar shrinks.—W. T. F. J. Problem 2,445.

COLORING

Q.—I would like to have a formula for an acid black on high brass which is used for twenty-four line buttons used by the United States Government. I have tried a hot solution of nitric acid, vitriol and sulphate of copper, but this does not seem to be very satisfactory.

A.—An acid black finish on brass is produced by immersing the cleansed articles in a solution of nitrate of copper and water in the proportions of 1 part of copper nitrate to 3 parts of water. Immerse the articles in the dip for a few seconds, then drain well and place upon sieve frames made up from brass wire mesh.

The solution should be heated in a small gas furnace until the copper nitrate is converted to black copper oxide. The method you are now using gives a partial copper nitrate, but there is no advantage in using it and the results are not as satisfactory when such a combination is used.

The simple nitrate of copper solution gives the best results and a little experimenting will determine which are the best proportions to use.—C. H. P. Problem 2,446.

DEPOSITING

Q.—If a copper deposit .0025 of an inch thick can be obtained in two hours' run in a cyanide and acid solution, making four hours in all, can this amount of copper be deposited in a hot agitated cyanide copper solution in half the time or two hours?

A.—If you obtain a deposit of copper .0025 of an inch thick by a two hours' deposit in a cyanide copper solution and two hours in an acid copper solution, it is possible to produce an equivalent thickness in a hot cyanide copper solution, providing the solution contains sufficient metal per gallon, about 3½ to 4 ounces of copper, and a rotating cathode.

The amperage, of course, would have to be just twice as much during the two hours' deposition in the cyanide solution to equal the four hours' time absorbed in giving the thickness now deposited by the combination of the cyanide and acid solutions; but it can be done.—C. H. P. Problem 2,447.

FINISHING

Q.—Can you advise what acid to use by itself or in connection with copper nitrate to produce the different greens?

A.—Calcium chloride will produce a yellow green verde in connection with the copper nitrate and sal ammoniac, but if it is wished that a distinct yellow show upon the green, then it would be advisable to apply the yellow afterwards.

This can be accomplished in the following manner. Mix dry orange chrome and yellow chrome with beeswax and a little turpentine. Dissolve the mixture by the aid of heat so that when it is cool a stiff paste is produced. When waxing down the verde greens with beeswax use this yellow mixture instead, and a distinct yellow tone will be obtained. By using gold rouge in the same manner the red or fire tones can be produced. Apply for colors in spots only.—C. H. P. Problem 2,448.

GENERATING

Q.—When operating under normal current what would cause the commutator of a direct current machine to run hot.

A.—Excessive heating of commutators may result from several sources. From either too much tension on the brushes, defective insulation between the bars and lack of lubrication in the brushes. Investigate these matters and you will no doubt find that one or the other is the cause.—P. W. B. Problem 2,449.

MELTING

Q.—We are experiencing considerable difficulty in obtaining sound castings from nickel-bronze of the following formula:

Copper	75.0 per cent.
Nickel	22.0 " "
Tin	.5 " "
Lead	2.5 " "

The nickel is melted first, then the copper melted down into it, the lead and tin added and then poured. We find very little, if any, slags or dross to skim from the top of the crucible. The castings appear very smooth and even on the surface, but under the scale, especially on the top side, we usually find them very porous, ranging from pin holes to the size of a No. 1 shot. Oil furnaces are being used for melting this metal.

A.—We would refer you to the article which appeared in THE METAL INDUSTRY in January, 1916, issue, entitled "Copper and Nickel in Munitions," which contains a number of valuable points regarding the melting of cupro-nickel, which is essentially the metal that you are making. In other words, the precautions which attend the melting of the regular cupro-nickel will apply with equal force to your mixture

Assuming that the molding conditions are correct and that the proper density of sand is employed in the mold the trouble may be looked for in the method of handling the metal in the fire. The most important point to be observed in the melting and mixing of copper-nickel alloys is to keep the nickel particularly well covered with charcoal during its melting period. It is good practice to put the nickel on top of a two-inch layer of charcoal in the bottom of the crucible and then more charcoal is put on top of the nickel and the copper is placed on top of this charcoal. The fire is carefully increased and the crucible watched, and as soon as the metal is melted down more charcoal is added so that at all times a good layer of charcoal is covering the metal. The lead and tin are not added until the last moment before pouring, and a thorough stirring is absolutely necessary.

If a reasonable amount of scrap is used and it is heavy this may be placed on top of the nickel and the copper on top of the scrap. We should not advise the use of more than 25 per cent. of scrap in making up mixtures, but if it is necessary to use more than this in order to use it up it would be better to cast the metal into ingots and then remelt. From the description of the trouble found and without knowing any more about the case would say that an attempt is being made to use too much scrap; or if this is not so then the metal is being overheated and too much of the oxides of copper and nickel are being formed.

As a flux for use on the top of the pot, after the metal has become melted and before pouring, for cleaning purposes ordinary bottle glass will be found to be quite satisfactory, although borax and sodium carbonate may be used with subsequent bad action on the sides of the crucible.—K. Problem 2,450.

METALLURGICAL

Q.—What metal will expand the most under heat and which will contract when cold?

A.—The metals that expand the most under heat are as follows:

Zinc	.0087
Lead	.0084
Tin	.0059
Brass	.0053
Copper	.0052

These co-efficients of expansion are from 0 to 100 degrees C.—K. Problem 2,451.

MIXING

Q.—Can you furnish us with the mixtures commonly used in steel mills on hot mill bearings, hydraulic screw nuts and phosphor bronze bearings?

A.—The best metal for the bearings of rolling mills is "S" phosphor bronze. It is hard, elastic and has a low coefficient of friction. It wears well without injuring the journal even when running hot. The mixture for this alloy should be phosphorus .35, lead 10, tin 10, copper 79.65. A greater amount of phosphorus than .35 per cent. is not needed to deoxidize the metal. More than this gives a slightly greater hardness, but this is offset by the increased cost and the tendency for the sand to burn fast to the castings. For nuts a mixture of phosphorus .25, tin 9.75, copper 90, may be used. This alloy is hard, dense and resists wear well.

In the more modern rolling mills there is much less hydraulic machinery than heretofore, much of it having been replaced by of salt to each pail of water.—J. L. J. Problem 2,452.

Q.—Could you supply me with reliable mixtures for the following:

(a) A core mixture for general brass and gun metal castings.

(b) The proportions of floor sand and fine Mansfield red sand for use as a facing sand in bronze castings.

A.—It is suggested that the following mixture be tried:

(a) 1 part of burned cores.
1 part of gangway sand.
1 part of coarse, sharp sand.

Temper with a mixture of 5 gallons of molasses to 50 gallons of water, adding 3 quarts of any good core oil. The mixing is best done in a mechanical mixer. If the cores are not sufficiently strong, a further addition of molasses may be made.

(b) A good facing sand may be made from 2 parts of floor sand and one part of fine Mansfield red sand dried carefully so as not to burn the sand, then rolled, passed through a No. 22 sieve, mixed thoroughly and wet with water containing a handful electric motors.—J. L. J. Problem 2,453.

MOLDING

Q.—Have you a formula of a composition for molds that will permit more than one cast of bronze, silver or gold? Have been using French sand, but find it too expensive for producing small ornaments such as badges, buttons, name plates and ornamental corners for frames.

A.—Considerable success has recently been had in the die casting of brass and this process of casting under pressure has been attempted frequently for the production of gold and silver articles. Castings made in this manner, however, are never free from blow-holes, the dies are very expensive and they soon crack. For articles such as those mentioned pressed brass, silver or gold are much superior. Great density and strength are obtainable, and, if high enough pressures are used, designs may be sharply reproduced.

Where it is desired to produce the above articles in permanent molds artificial graphite offers a material that is being more and more used. These metals do not attack the graphite and the castings readily leave the molds. The molds may be heated to any desired temperature before casting and the castings will have a clean, bright and smooth appearance. The graphite can be readily machined, and while it cannot be adapted to all kinds of castings there are many places where its use will be found extremely advantageous. The permanent graphite mold can in most cases be used as the drag portion of the mold while the cope is made of green sand, a new cope being rammed up each time.—J. L. J. Problem 2,454.

OXIDIZING

Q.—Can you give us some information as to how to renew an arsenic and caustic soda solution for oxidizing when it is worn out?

A.—To replenish the arsenic and caustic soda solution dissolve 4 pounds of caustic soda in a gallon of water, heat gradually to 200 degrees then add 3 pounds of powdered white arsenic and stir thoroughly until dissolved. Add small proportions of this concentrated solution to the regular plating solution when the deposit is slow.

If you have been accustomed to use cyanide in the solution then small proportions of cyanide should be added. Not more than ⅛ to ¼ ounce per gallon of solution at one time.—C. H. P. Problem 2,455.

PLATING

Q.—Will you please inform me how to prepare a platinum plating solution? There are many formulas for platinum solution, but I have never seen a working one as yet.

A.—The following formula gives excellent results for a platinum solution:

One ounce of platinum chloride dissolved in one-quarter of cold water, add 10 ounces phosphoric acid (syrupy) 50 per cent. Add sufficient strong ammonia until a strong odor prevails. Take 50 ounces of phosphate of soda and dissolve in one-quarter of water until boiling, then add this solution to the chloride solution, and put in a receptacle and boil for two hours. While in the boiling state add two ounces of bi-carbonate of soda and one-half ounce nitrate of potash. Should the water evaporate it can be refilled until a gallon solution is obtained. The voltage should be at six, and the bath should be kept at the boiling point when in use. Platinum anodes are necessary.

In order to replenish this bath would suggest that you work the same out entirely, and replenish the same by using the above mentioned chemicals and the old solution and the addition of water if necessary.—C. H. P. Problem 2,456.

RESISTING

Q.—Please give me the composition of acid-proof metals suitable to withstand any of the three acids—that is, hydrochloric, nitric or sulphuric, or a mixture of two or more of them. The specific gravity of the working solution to be about 1.10 to 1.15 and used hot.

A.—There are no non-ferrous metals that resist all the acids you mention. Duriron and other high silicon alloy castings or castings of silicon itself are as acid resisting as any cheap materials.—J. L. J. Problem 2,457.

PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

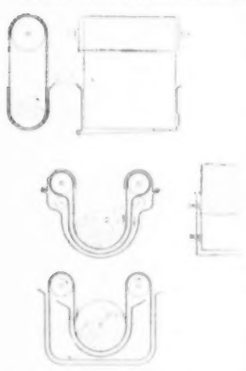
1,224,057. April 24, 1917. **Method of Recovering Zinc and Iron from Solution Thereof.** C. E. Baker, Chicago, Ill.

This invention is a novel method for recovering zinc and iron from solutions containing these metals, for example, as chlorids or sulfates. Such solutions are formed as a product of various metallurgical operations, such as the pickling of galvanized scrap, the treatment of ores and other metallurgical products with acid solvents or ferric salt solutions, etc.

Assuming the solution to contain iron and zinc as chlorids of sulfates, and to be free from less electropositive metals, the solution is electrolyzed, using an insoluble anode, and preferably a cell in which the electrodes are separated by a porous partition or diaphragm. For example, in case of chlorid solutions, the anode may be of graphite, while the cathode may take the form of a plate or sheet of iron or other metal. Iron and zinc are simultaneously deposited at the cathode, while the chlorin, which is liberated at the anode, may be collected for use.

1,224,191. May 1, 1917. **Machine for Polishing Metal Bodies.** Charles Medgyes, of Budapest, Hungary, assignor to Wenger & Co., of Delemont, Switzerland, a firm.

This invention relates to a device for polishing various articles, especially metal goods, by means of loose, small polishing bodies, such as highly polished small steel balls and nails. When polishing in drums there is the disadvantage that the drum for the time during the charge and discharge of the goods to be polished has to be stopped whereby, especially with goods which can be polished quickly and easily, considerable loss of time occurs. With the open devices for polishing, there is, however, the disadvantage that the goods to be polished have the tendency to be shifted together with the polishing material in the direction of run of the latter; if, however, said goods, in order to prevent this shifting are held, only those surfaces of said goods are polished which face the direction of run of the polishing material.



The present invention, shown in the cut, attains the combination of the advantages of both devices by carrying out the polishing in an open receptacle into which is inserted the lower part or bight of an endless circulating conveyor belt carrying the polishing material. It is evident that the direction of movement of the belt can be reversed from time to time.

1,224,339. May 1, 1917. **Vapor Treatment of Metals.** William A. Darrah and Samuel Trood, of Wilkinsburg, Pennsylvania, assignors to Industrial Development Company, a corporation of Pennsylvania.

This invention relates to methods of treating metals by the introduction of other substances into them. It is frequently desirable to change the qualities of a metal by the addition of other metals or other substances, and it may be expedient for reasons of cost or otherwise to affect this addition after the metal is brought into the final form; in other words, under conditions such that a surface alloy or compound is preferable to a homogeneous metal. The invention, therefore, comprises a method of forming a surface compound or alloy which possesses the desired properties. Thus iron may be treated so that the outer layer will be rust proof; copper or iron may also be treated, so that its outer layer will be extremely hard or extremely tough, or resist certain agents, etc.

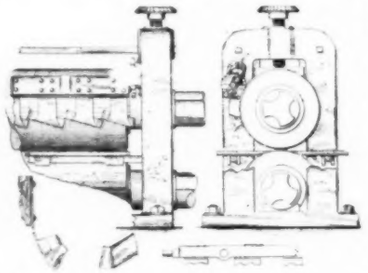
The depth to which this process is applicable is, of course, dependent upon the surrounding conditions.

The patent covers:

The process of condensing a vapor upon a metal which consists in placing said metal in a chamber in the presence of the material to supply the desired vapor, substantially removing all vapors and gases but those due to the treating material and heating said chamber while the contents are maintained at a pressure lower than atmospheric.

1,224,389. May 1, 1917. **Apparatus for Polishing Rolling Mill Rolls.** A. S. Lind, McKeesport, Pa.

This invention relates to an improved apparatus, as shown in cut, for polishing rolling mill rolls and it comprises a series of removable polishing blocks, held in contact with said rolls by means of spring-actuated holders, arranged in oblique positions, the one overlapping the other, a means for placing a pressure upon said blocks, and a means of maintaining said pressure, together with the certain details of construction and combination of parts, as will be fully described hereinafter.



In the present practice and method of rolling "tin plate," and also all sheet metals, it is necessary to "close the mill" at certain intervals, in order that the rolls may be polished, for reasons well known in the art. This necessitates a considerable delay, resulting in the loss of time, expense, trouble and increased cost of the product.

The object of this invention is to place a permanent polishing apparatus in connection with each set of rolls that will continuously polish said rolls while the same are in operation, without interfering with the workmen or product of the mill.

1,224,418. May 1, 1917. **Flux for Welding Nickel and Nickel Alloy.** Richard Samesreuther, of Duesseldorf, Germany, assignor of one-half to the firm of Autogenwerk Sirius, Gesellschaft Mit Beschrankter Haftung, of Duesseldorf-Eller, Germany.

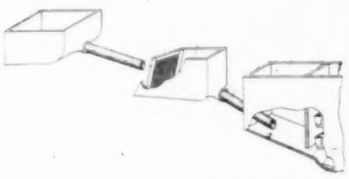
This invention consists in a flux for welding nickel and nickel alloys which avoids the above stated objections.

According to the invention the inventor uses in conjunction with metal chlorids and chromium a flux of fireproof materials which have the property of avoiding the influence of the atmosphere upon the melted metal. This flux contains alkalis as its essential substance which may be mixed with metal-chlorids. The flux may be in the form of a paste or of a powder.

The alkali, say waterglass, covers the welding piece with a fireproof film, thus avoiding the influence of the atmosphere upon the heated metal, whereas the metal-chlorids, such as chlorids of magnesium or molybdenum, decompose the metal combining with the nickel and the chlorids, dissolving the oxids of nickel. An addition of chlorid of calcium may be used in order to dissolve any possible slags.

1,224,659. May 1, 1917. **Apparatus for Mixing Molding-Sand.** William J. Nelson, of West Albany, N. Y., assignor to

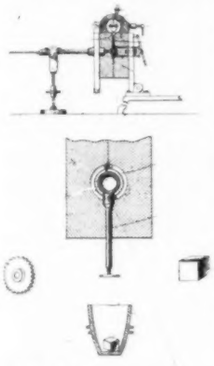
West Albany Moulding Sand Co., of West Albany, N. Y., a corporation.



This invention relates to apparatus for mixing molding sand, and the object of the invention is to provide a means for mixing the sand and loam in proper condition for successful use in the art of molding. The inventor claims: An apparatus, shown in cut, for mixing molding sand, comprising a receptacle for the sand, loam and water; means connected with the lower portion of the said receptacle whereby the solution from the receptacle may flow by gravity; a grille into which the solution from the receptacle flows and is strained; pipes leading from the grille to a mixing device through which the solution after passing through the grille will flow by gravity; a mixing box into which said solution is delivered; a floor in said mixing box placed at an angle to the horizontal; and an obstruction in said mixing box, with a restricted opening at the bottom through which the mixture of sand and loam is excluded.

1,224,906. May 8, 1917. **Method or Art of Casting Fluid Metals.** Herman H. Doehler, of Brooklyn, N. Y., assignor to Doehler Die Casting Company, a corporation of New York.

This invention relates to the method or art of casting fluid metals, and more particularly to a method or art wherein the metal is forced and compacted within a mold by means of fluid pressure.



The invention, as shown in cut, consists primarily in a method or art of casting fluid metals consisting of subjecting a melting pot or crucible containing metal of substantially the bulk of the casting to be made to a temperature approximating that of the fusing point of the metal, pouring the molten metal in said melting pot or crucible from within an inclosed chamber into a metal mold, and thereafter forcing and compressing the metal by following it up with an elastic fluid under high pressure.

The essential and dominating characteristics of the invention are that a charge approximating in bulk the mass of metal required for a single casting is brought to the desired or necessary temperature while in a melting pot, and that the charge is poured directly from said melting pot, as a ladle, into the mold or die under the conditions specified in the patent. These characteristics, the inventor has found, prevent a loss of sufficient heat to prevent the metal flowing freely from the pressure chamber into the mold and permit the casting of a metal having a high fusing point while at a temperature substantially that of the said fusing point and without raising the temperature of the mold above normal.

1,224,941. May 8, 1917. **Soldering Compound.** F. E. J. Litot, Wilkinsburg, Pa.

This invention relates to a soldering composition for soldering aluminum either to itself or to other metals. Heretofore it has been found impracticable to solder aluminum effectively; that is, so that the soldered joint will withstand the ravages of time and changes of temperature and moisture.

The present invention has for its object a soldering composition by means of which aluminum parts may be soldered to each other or to other metals, and in which the soldered connection is both strong and durable. It is also an object of the invention to provide a soldering compound which has a sufficiently low melting point to prevent the aluminum pieces being soldered from becoming annealed because of too high heat being required to melt the solder.

The patent covers: A soldering compound, containing zinc, tin and lead, the tin and lead being each not less than the zinc, so as to reduce the melting point of the zinc to a safe limit below the heat which would injure the parts being soldered.

1,225,044. May 8, 1917. **Method for Producing Bands of Aluminum.** Erwin Richard Lauber and Robert Victor Neher, of Emmishofen, Switzerland.

Methods have been proposed by which small sheets or foils of aluminum of 0.0003 inch in thickness can be produced. Methods have also been proposed by which only one band of aluminum of a thickness less than 0.0005 inch, as, for instance, 0.0003 inch, can be produced, which may be produced a mile, more or less, in length.

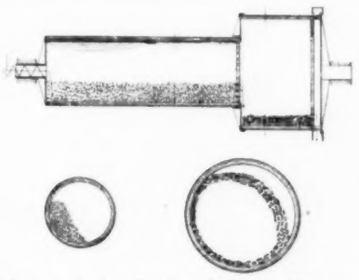
According to this invention layers of bands of aluminum of a thickness less than 0.0008 inch, as, for instance, 0.0003 inch, can be produced.

According to this invention aluminum after being annealed by heating to 270° to 320° C. and then allowed to cool, is drawn by rolls at a high tensile strain and under a comparatively small pressure.

The material can best be elongated when annealed at the above mentioned temperature, as it then possesses the highest available tensile strength. As the material retains this strength when becoming cold again, but loses it by mechanical treatment, a repeated annealing of the material at the above mentioned temperature becomes necessary from time to time. This annealing may be performed at suitable intervals during the treatment of the material. As a consequence the aluminum band can be subjected to so high a tensile strain that it is not only elongated, but is also brought in a smooth condition to the rolls.

1,225,061. May 8, 1917. **Grinding in Tube Mills.** Oscar Schultz, New York, assignor to F. L. Smidth & Co., New York.

This invention relates to the fine grinding of various substances, such as cement clinker, coal for use in rotary kilns, etc., in rotary drums, as shown in cut, which are charged with grinding bodies, such as flint pebbles or metallic grinding bodies.



It is the object of this invention to permit both the preliminary grinding with flint pebbles and the final grinding with metallic grinding bodies to be accomplished at one operation and in one mill and at the same time to enable the greater efficiency possible through grinding with metallic grinding bodies at relatively high speed to be realized. In accordance with the invention the grinding with flint pebbles is carried on in one part of the mill which has a relatively smaller diameter and therefore a relatively slow peripheral speed, and the grinding with metallic grinding bodies is carried on in an immediately succeeding part of the same mill which has a larger diameter and therefore a greater peripheral speed so that the flint pebbles have the cascading action and are not broken up with excessive rapidity, and the metallic grinding bodies have such speed that under the resultant of momentum and gravity they fall freely and have a percussive action.

1,225,764. May 15, 1917. **Aluminum Soldering Flux.** H. V. Burt, Rock Island, Ill.

This invention has reference to aluminum soldering flux, and has for its purpose the preparation of a sheet of aluminum metal for the union therewith of aluminum solder, such as is employed in repairing aluminum vessels and articles. It is a recognized fact that the welding or uniting of any metal or alloy of metals with aluminum is difficult of accomplishment on account of the apparent reluctance of the aluminum to unite or cohere with other metals. By the use of this invention this reluctance is overcome, and by the application thereof to the aluminum immediately preceding the use of the solder, a perfect and lasting union is effected.

The ingredients which are used in preparing the flux, and the proportions thereof, are substantially as follows: oleic acid, 90 parts; spirits of ammonia, 8 parts; oil of citronella, 2 parts.

EQUIPMENT

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

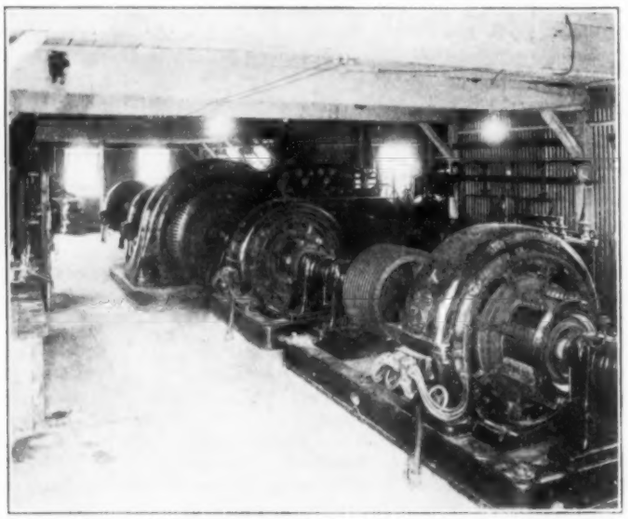
MAGNESIUM MANUFACTURING PLANT

With the immense government appropriation for aviation, aeroplanes, aeroplane motors and the recent important development of light aluminum motors and parts for automobiles, it will be of much interest to all manufacturers of these to know that magnesium, which is one-third lighter than aluminum, is now being manufactured in this country in large quantities by the

PLANT OF AMERICAN MAGNESIUM CORPORATION AT NIAGARA FALLS, N. Y.

American Magnesium Corporation, of Niagara Falls, N. Y., who have developed a new process which will insure a large supply for commercial purposes and which supply is now available.

In addition to its low specific gravity magnesium is an important metal in the foundry, owing to its great affinity for oxygen and nitrogen. These qualities render it an important adjunct in foundry practice for use in de-oxidizing and denitrifying copper alloys. It is particularly valuable where it is desired to make copper castings of a high electrical conductivity,



THE ELECTRICAL EQUIPMENT OF THE AMERICAN MAGNESIUM CORPORATION.

as a small percentage of magnesium, in say amounts of upwards of one per cent, does not have any appreciable effect in lowering the electrical conductivity of the copper; whereas other products that are used for this purpose do decrease the electrical conductivity to a marked extent.

A small quantity of magnesium when used in aluminum, brass and bronze mixtures act as a cleanser and prevent porosity and at the same time adds greatly to the tensile strength of the finished product. One of the drawbacks encountered in the use of magnesium as a de-oxidizer and cleanser in the foundry has been that its extreme lightness makes it difficult for it to enter the body of the molten metal that it was desired to treat.

The American Magnesium Corporation announce that they are now making alloys of magnesium with aluminum, copper, nickel and other metals so that these alloys may be purchased and used in order to introduce the desired amounts of magnesium into newly-made mixtures.

As will be seen by the photographs the company is extremely well located and has complete electrical equipment for producing the necessary current for the reduction of magnesium from its ore. The company has favorable contracts for power and raw materials and is prepared to supply any demand for its product that may arise. I. R. Edmonds is president of the new company.

PARKER RUST-PROOF PROCESS

BY DICK FARRINGTON.

Prevention of rust has long been a big problem in all branches of manufacturing where iron and steel are used in production. Attempts to evolve a successful cure for this disease of the metal family has occupied the attention of the foremost chemists and research engineers for many years, but their efforts brought out only unsatisfactory and discouraging results.

Rust is what the metal doctor might feel wont to term a form of tuberculosis prevalent only in the iron and steel families. The ravages of the disease, according to a statement made recently by a leading engineer, results annually in a dead loss of approximately $100,000,000. This tremendous figure makes it natural to presume that rust is king of the scrap iron heap.

But, how is this serious metal affliction to be overcome? How is the disease to be eradicated? These questionas have long remained unanswered.

Clark W. Parker, president of the Parker Rust Proof Company of America, and discoverer of the Parker Process, is looked upon as the man who has developed the only successful anti-corrosion process. The big plant which has been erected by the company in Detroit during the last few months stands out as a monument to the early success of Mr. Parker and his rust-proofing process. The plant which has been built in Cleveland and those about to go up in other cities, not to say anything about the score of private plants installed in many large factories throughout the country, add luster to the future of the company.

After years of experimentation during which time he acquired exclusive basic patent rights, the process has been pronounced absolute and dependable by hundreds of manufacturers. Metals treated by the Parker method have been found to be positively immune from corrosion. Most severe tests have been made on metals of iron and steel ranging from the famous Perry cannon which stands in the Detroit City Hall terrace to the smallest dental needle, and after all sorts of exposure to rust conditions they have stood the test without the semblance of rust. An ordinary piece of unfinished iron exposed to the weather for more than two years is today absolutely free from corrosion. Interested engineers are conducting private tests every day, but as yet none has been able to find a weakness in the process. Each experiment to determine the merits of the Parker discovery opens a new usefulness for it.

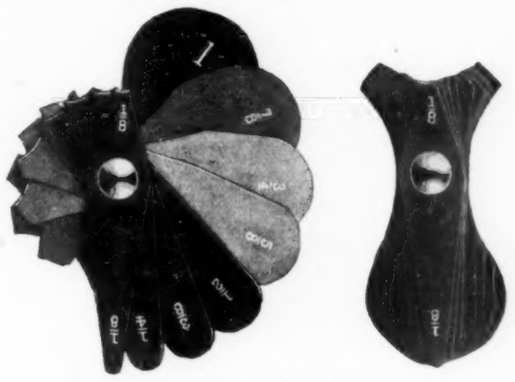
An outstanding illustration of the treatment is that one of the largest motor car factories in the world is using Parker-processed iron and steel in constructing its carburetors where brass heretofore has been necessary. More than 40 of the largest automobile manufacturers are now using the process.

Mr. Parker first conceived the idea of rust proofing early in 1914, and after extensive experimentation finally arrived at a chemical mixture which begun to show an effective anti-corrosion. He improved the process with experiments, and it was not long before he had perfected the method. He continued to experiment and with the aid of other chemists found the process practical and reliable.

Realizing the commercial possibilities of such a process, Mr. Parker acquired all patents, even on dipping tanks, equipment, etc. These now are controlled by the Parker Rust Proof Company of America, with main offices and factories in Detroit. Wyman C. Parker, secretary and treasurer, has been a power in promoting the affairs of the company.

RADIUS GAUGE

The Moss-Ochs Company, 3387 East 116th street, Cleveland, Ohio, have recently placed upon the market the gauge shown in the cuts, which they call the Universal Radius Gauge and which is used for determining the concave and convex surfaces of tools, dies and so forth from ⅛ inch to 1 inch diameter. It is stated



UNIVERSAL RADIUS GAUGE.

that this gauge is indispensable for grinding round-nose tools. Instead of having separate small leaves for concave and convex surfaces, which leaves as a rule are so small that measurements are obtained with difficulty, the Universal Radius Gauge has eight blades which have the concave on one side and the convex on the other so that it may be regulated instantly to whichever surface is required.

Further information regarding these gauges may be had upon request.

COOPERITE

As noted in the May issue of THE METAL INDUSTRY, a patent was issued on April 3, 1917, to H. S. Cooper for an alloy metal which has been termed Cooperite. Mr. Cooper says the following relating to his alloy:

"Cooperite is the newest and best alloy known for use in the manufacture of edge tools of all descriptions, mainly machine tools for milling cutters, cast tools for lathe and plane use, etc. Tests carried out in conjunction with the largest steel companies in the country indicate that this product is revolutionary in character and far superior to high speed steel and the alloy known as Stellite. Milling cutters and intricate tools of all descriptions may be cast from this alloy in such desired and complete forms as to eliminate all machining, only a minor grinding operation being necessary to make finished tools. Owing to the fact that the alloy remains in liquid state for a considerable period before solidifying it is possible to make castings with great ease; and so far as known is the first alloy discovered from which intricate machine tools can be made successfully.

"The specific gravity of Cooperite is much lower than Stellite or high speed steel which further reduces the cost of the tools to the consumer. The thermal-conductivity is higher than either of the above alloys which increases the cutting efficiency of the tools by carrying away the heat from the point of tool. This advantage is shown in cutting performances, Cooperite giving a satin finish similar to high speed steel, Stellite a bright, sometimes glazed finish.

"These tools in hardness compare very favorably with other alloys, the Brinell hardness may be varied without sacrifice of toughness from 400 to 600. Scleroscope 50 to 85, for example, in a test of Cooperite with Stellite and high speed steel of about equal hardness, tools ½ x 1 x 5 in., the Stellite broke under a pressure of 600 pounds, while Cooperite required 3,900 pounds and high speed steel 4,200 pounds.

"This test was carried out on a bar of semi-annealed steel, Carbon .57; Manganese, .37; Silicon .26; the tensile strength was 106,000 pounds, 1/32, cut 3/16, speed 85 feet per minute."

AVERAGE IN MINUTES

	Cooperite	High Speed Steel	Stellite
Heat 5	24:00		
" 6	32:00	10	49
" 32	53:79		
" 34	64:00		

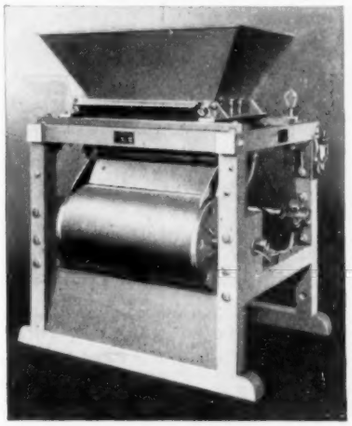
"The cost of production of this alloy is much lower than Stellite or high speed steel—these compare approximately as follows:

Cooperite	$ .50 to	$ .85	per pound.
Stellite	1.50 "	3.00 "	"
High Speed Steel	1.25 "	1.75 "	"

NEW MAGNETIC SEPARATORS

The Magnetic Manufacturing Company, located at 601 Enterprise Building, Milwaukee, Wis., are putting on the market an improved magnetic separator known as their type "L." Alvin Dings, the designer, claims for this machine efficiency, capacity, simplicity and durability. It is guaranteed to be equal in efficiency to any magnetic separator used for the same purpose and it is claimed that it will handle from two to three times as much material in a given length of time as any magnetic separator of equal size and price.

This separator has the following desirable features: There



NEW MAGNETIC SEPARATOR.

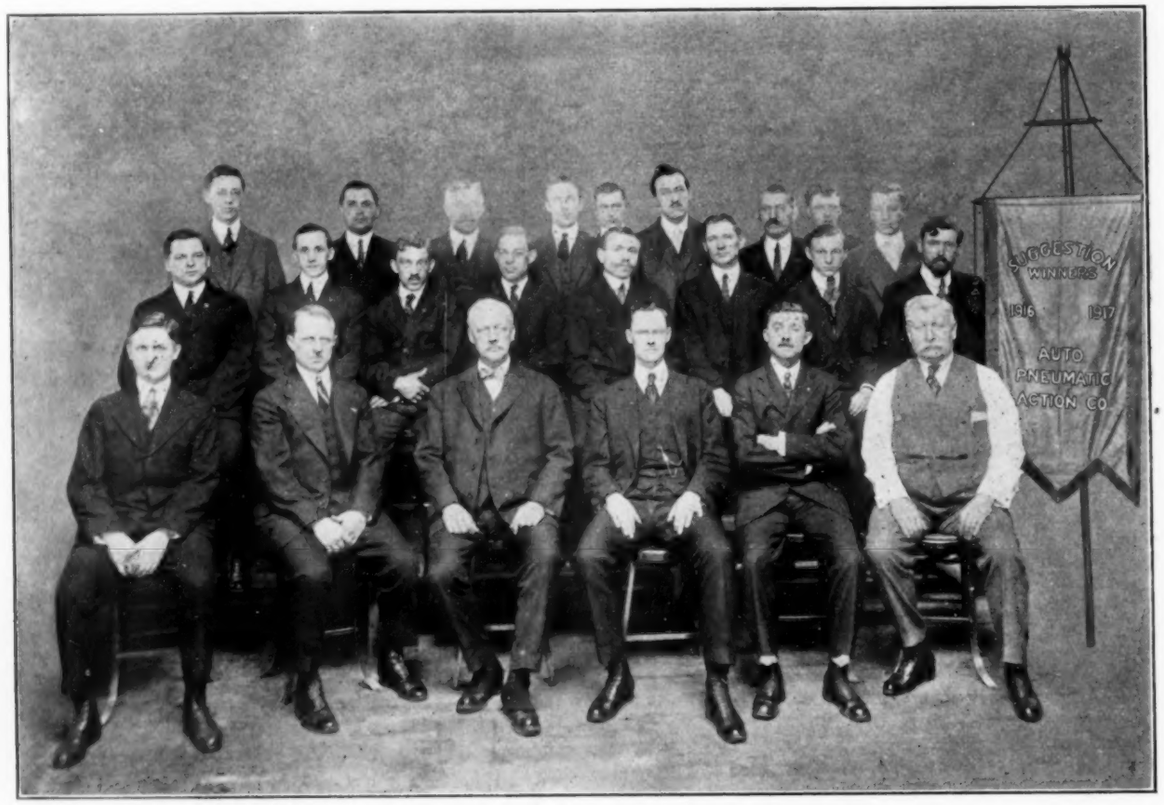
are no sliding contacts or brushes of any kind used in the operation of this machine. No vibrating conveyor or moving auxiliary magnets; therefore no magnetic strain upon the bearings, the machine requiring very little power to operate. The iron is discharged at once without being carried across a conveyor. This and the fact that the material passes rapidly through a strong magnetic field is the reason for this machine's great capacity.

It is built in five sizes; the material having a spread of 8 inches in the number 1 machine, 12 inches in the number 2, 16 inches in the number 3, 20 inches in the number 4, and 24 inches in the number 5. The capacities of these machines for separating dry turnings or borings are from 800 pounds to 2,400 pounds per hour. The prices vary in proportion to size of machine and equipment. These machines are furnished for belt-drive, belt drive with generator, motor driven with D C motor, and with motor generator set for alternating current. The Magnetic Manufacturing Company are shipping these machines out on thirty day's approval to all those having satisfactory rating.

PYROMETERS*

By Richard P. Brown

In an address before the Steel Treating Research Club of Detroit, Michigan, Richard P. Brown, president of the Brown Instrument Company, Philadelphia, Pa., gave some valuable information relating to pyrometers. Mr. Brown called his address Pyrometers, their past, present and future. He briefly told the history of the pyrometer and told of its uses. He described the various types now in use as Optical, Resistance, Thermo-Electrical and Radiation Pyrometers. He told how the Millivoltmeter and Potentiometer methods are used and finally described the methods of standardizing pyrometers. He said in this connection:



SUGGESTION WINNERS FOR 1916-17 OF THE AUTO-PNEUMATIC ACTION COMPANY, NEW YORK, N. Y.

The Man Sitting at the Extreme Right End of This Picture is Wm. J. Keeley, President of This Company. The One Sitting Third from the Left in the Front Row is Thomas Danquard, the Inventor of the Famous Auto De Luxe Player Action. The Man Holding the Banner is the Foreman of the Department Which Submitted the Greatest Number of Practical Suggestions Within the Year.

Methods of Standardizing Pyrometers.

"It is very essential, if accurate results are to be secured from pyrometers, that they be re-standardized at frequent intervals. If a thermo-couple is installed in a furnace and allowed to run for six months without being retested, sooner or later it will fail, and the user will find that he is away off in his temperatures. This is simply caused by the falling off in the voltage of the thermo-couple with continuous usage. It is therefore of particular importance that the thermo-couples, whether base metal or platinum, be checked at frequent intervals. The frequency depends on the precision necessary in the work and the equipment available. Some plants make a point of checking their thermo-couples once a week, but it is advisable if this can be done at least once a month.

"This checking can be very satisfactorily done by maintaining a standard platinum thermo-couple used for checking secondary standards of base metal. An electric furnace should be used not less than 10 inches deep so that a base metal thermo-couple can project at least 6 or 8 inches inside of the furnace. The base-metal thermo-couple can be tied together with asbestos string to the standard thermo-couple, with the junctions almost touching each other. The thermo-couples should never be tested in their projecting pipe. A base metal thermo-couple should never be tested in a furnace with an insertion of less than 6 inches, for the reason that the cross section or the thermo-couple wires is large, and the outer end of the thermo-couple wires in the cold air conduct the cold along the wires into the furnace and will reduce the indications at the thermo-couple junction on this account. The temperature of an electric furnace should be maintained constant for at least fifteen minutes before a reading is taken, and the tests should preferably be made at all times at the working temperature of the thermo-couple.

"If the thermo-couple under test reads low, and it has no adjustable resistance, it will have to be junked. It is furnished with a resistance for adjustment purposes, this adjustment can be easily made with a soldering iron.

"The freezing point of pure salt is an excellent method of testing thermo-couples, or of the complete pyrometer consisting of the thermo-couple, leads and instrument. Insert a thermo-couple in a small crucible containing pure salt; ordinary table salt is satisfactory, and heat the salt to about 1600° F. Remove the crucible from the heat and allow it to cool off. At the freezing point of the salt, which will be indicated by the temperature remaining reasonably constant for four or five minutes, the pyrometer should read 800° C. or 1474° F.

"The melting point of a number of different metals is quite satisfactory for the checking purposes. The metals most generally used for this purpose, and their melting points below:

Tin	450° F.
Zinc	787° F.
Silver	1761° F.
Gold	1945° F.

*A complete description of all types of pyrometers appeared in The Metal Industry, 1913.

"The Bureau of Standards at Washington is in good position to test pyrometers and thermo-couples for manufacturers in this country, and it is a good plan to have a standard platinum or base metal thermo-couple tested at the Bureau of Standards, and they can furnish the millivolt values for the thermo-couple. This can be retained as a primary standard to test the secondary thermo-couple. The cost of such a test by the Bureau of Standards is usually about $10, and the expense is well warranted."

He closed with the following prediction:

THE FUTURE FOR PYROMETRY.

"It would seem that the greatest development work in temperature measuring instruments will be done with the perfection of optical pyrometers, resistance thermometers and thermo-electric pyrometers. There is a field for a high grade optical pyrometer which can be used by any number of operators, who will all secure the same results from the instrument.

"Resistance Thermometry will for some time continue to be limited to use at low temperatures unless some suitable metal is found for use in place of nickel to form the bulbs.

"In thermo-electric pyrometry it is possible to develop better materials than those found to date for base metal thermo-couples. The insulation or protecting tube will be difficult to improve upon. With the direct reading millivoltmeter doubtless the resistance of these instruments will be greatly increased, and I know that we have spent an endless amount of development work the last year of two along this line, and other pyrometer manufacturers are doubtless doing the same thing. The more the internal resistance of the pyrometer can be increased, and at the same time maintain the robustness of the construction, the better the instrument."

ASSOCIATIONS AND SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

AMERICAN INSTITUTE OF METALS

Advance information that has been issued in relation to the 1917 convention which will be held in Boston, Mass., on September 24 to 28, includes the announcement that the headquarters of the American Institute of Metals will be at the Hotel Somerset and its meetings will be held at this hotel or at the exhibition building, Mechanic's Hall. The American Foundrymen's Association will be at the Copley-Plaza Hotel and its meetings will be held in the Mechanic's Building.

As told in our correspondence letter from Boston the foundrymen of New England have a strong organization to provide for the reception and entertainment of the visitors. Among the committees already formed are the following: Executive, W. J. Lavelle, chairman; Reception, E. A. Tutein, chairman; Finance, W. A. Viall, chairman; Ladies' Entertainment, R. D. Walker, chairman; Entertainment, C. A. Read, chairman; Golf, J. C. Henshaw, chairman, and Press, W. E. Freeland, chairman.

Manager of exhibitions, C. E. Hoyt, reports that up to date of May 16, eighty applications for space had been received and that two interesting facts stand out in connection with this year's exhibit. First, the large amount of space being taken, the average per exhibitor having increased to 310 square feet, and secondly, that the record made is with the assistance of only six new concerns who have never exhibited before. It is a significant fact that those who know the exhibits are the first to file application, and for increasing amounts of space.

Secretary Corse, of the American Institute of Metals, has sent out the following notice:

Be sure and reserve the dates of September 25 to 28, inclusive, for the meeting of the American Institute of Metals in Boston.

The hotels of Boston are of such a size that it is impossible for all the associations to have headquarters together. The American Institute of Metals has, therefore, selected the Hotel Somerset on Commonwealth avenue as headquarters. In case this hotel cannot take care of all our people, the Hotel Puritan, next door, will undoubtedly be able to arrange for the balance.

F. C. Hall, the manager of the Hotel Somerset, will send you, shortly, literature describing the hotel, and you are urged to make your reservations promptly, as it is very important that all of our members get rooms at either the Somerset or the Puritan, on account of the fact that the meetings will be held in the Somerset. These two hotels are about five minutes' walk from the exhibition buildings in an opposite direction from the headquarters of the American Foundrymen's Association, which will be at the Copley Plaza. You are especially urged, therefore, to make your reservation early, so that the hotel people may know what to expect and reserve sufficient rooms to take care of our membership.

The Hotel Somerset is one of the most delightful hotels in Boston. The accommodations there for both our meetings and members will be ideal. Don't overlook the matter of reservations. We want to make a special effort this year to have all our members together.

AMERICAN ELECTRO-PLATERS' SOCIETY

New York Branch—Thomas B. Haddow, president and W. H. Betz, 936 Madison street, Brooklyn, N. Y.

The two meetings held during the month of May were devoted to the nominating and election of new officers for the ensuing year. The newly elected officers are: Thomas B. Haddow, president; G. E. Sterling, vice-president; Wm. Fischer, financial secretary; W. H. Betz, recording secretary, and R. Massicotte, sergeant-at-arms, and were installed by Charles H. Proctor. Mr. Proctor has been appointed a special delegate to the St. Louis convention to read whatever papers are sent by the New York branch.

Newark Branch—John L. Merrigold, president and F. W. Matts, Jr., secretary.

The following officers for the coming year were elected at the second May meeting of the Newark Branch: John L. Merrigold, president; Walter Gregory, vice-president; F. W. Matts, Jr., secretary; Roy Stout, treasurer; George Onkson, librarian, and Edward W. T. Faint, Horace Smith and Henry Bergfels, trustees. The newly elected officers were installed by Thomas Haddow, ex-president and president-elect of the New York Branch at a meeting held on Friday, June 1, and at which meeting addresses were made by the Rev. J. Madison Hare, chaplain of the Fourth New Jersey Infantry, and by the Rev. Dr. Thompson of Forest Hill, N. J.

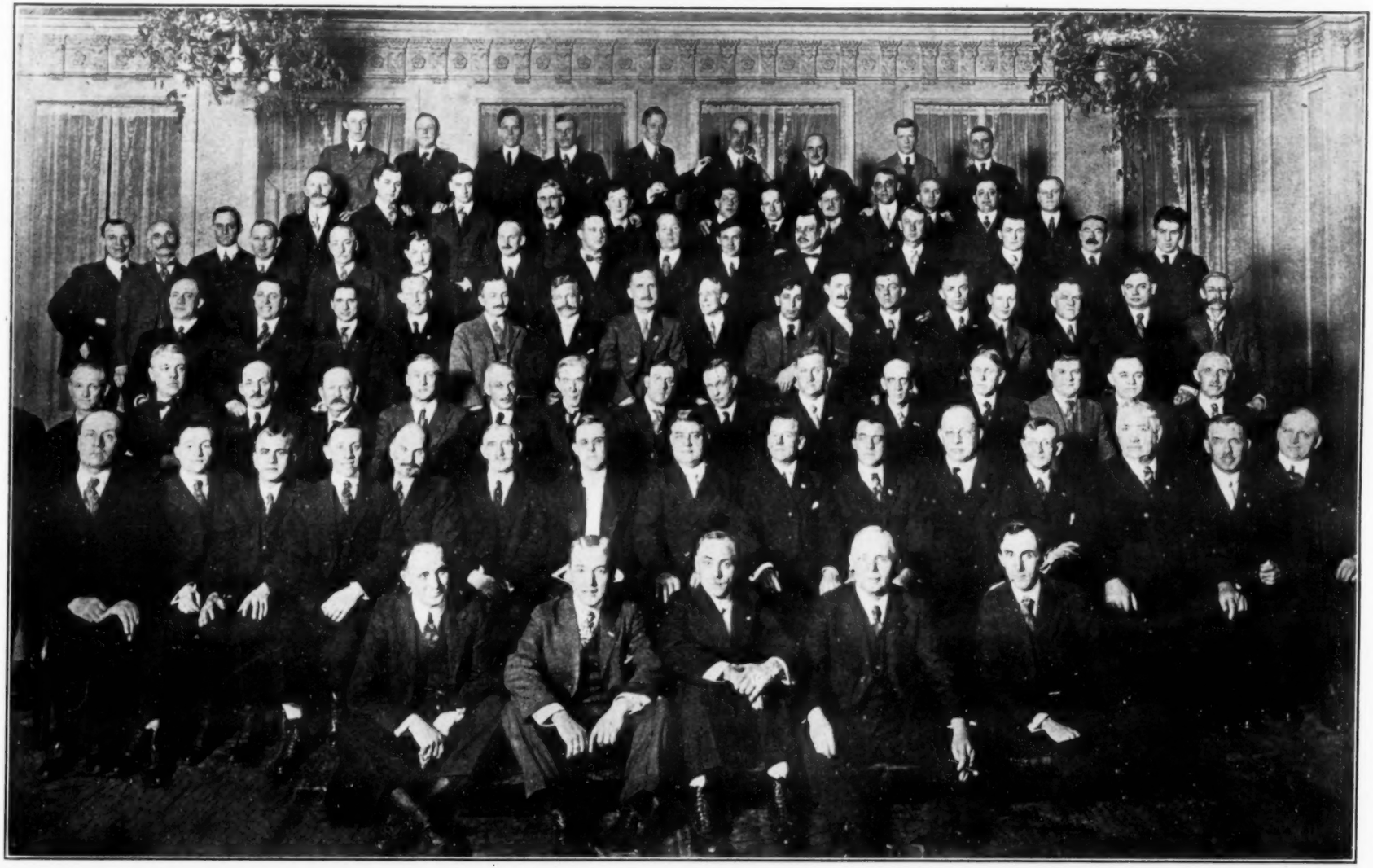
This branch has issued a very complete little booklet giving the names of the members of the branch and which also contains information which will prove valuable to electro-platers.

St. Louis Branch—H. J. Richards, president, and H. H. Williams, secretary and treasurer.

The regular monthly meeting was held Saturday evening, May 19, in the Assembly Room of the St. Louis Public Library, at which time the chairmen of committees for the convention to be held in St. Louis, July 5, 6 and 7, made their reports. The following officers for the coming year were also elected: H. J. Richards, president; George Lamkemeyer, vice-president; H. H. Williams, secretary and treasurer; E. J. Musick, librarian, and C. Weygandt, H. Duebelbeis and J. T. McCarthy, board of managers. The delegates to the convention are: F. C. Rushton, E. W. Heil, H. G. Nestman and H. Duebelbeis.

Indianapolis Branch—B. D. Aufderheid, president, and Louis Mertz, 1725 Union street, Indianapolis, Ind., secretary.

The regular meeting was held on May 12, at which time B. D. Aufderheid and Mr. Wright were elected to act as delegates to the annual convention in St. Louis, Mo. The following officers were also elected for the ensuing year: B. D. Aufderheid, president; George Barrows, vice-president; Louis Mertz, secretary-treasurer; C. C. Cromer, librarian, and R. Hennessey, G. Becktel and J. McDermott, managers.



BANQUET OF BRIDGEPORT BRANCH OF AMERICAN ELECTRO-PLATERS SOCIETY AT HOTEL STRATFIELD, BRIDGEPORT, CONN., MAY 12, 1917

That the Banquet of the Bridgeport Branch of the American Electro-Platers Society, held at The Stratfield Hotel on Saturday evening, May 12 was a success, we have but to refer to the accompanying picture, taken immediately preceding the banquet. In addition to the number shown in the picture, several platers registered a few minutes before the banquet, making a total of 97 present. The attendance was not as large as had been anticipated, Mr. N. A. Barnard reporting that he had received 120 advance reservations.

Following the dinner, Mr. W. G. Stratton, Toastmaster, introduced the speakers, whose subjects were as follows:

Albert W. Claflin, "METRIC SYSTEM"; D. W. Wheeler, "ADVANTAGES OF MEMBERSHIP IN THE PLATERS SOCIETY"; George B. Hogaboom, "PLATERS OPPORTUNITIES"; Dr. F. C. Stanley, "THE GOOD WORK BEING ACCOMPLISHED BY THE BRIDGEPORT BRANCH."

A number of Foreman Platers exhibited samples of the latest finishes produced in up-to-date plating shops.

The Celluloid Zapon Company, 185 Church Street, New Haven, Conn., distributed souvenir pocketbooks. Among the souvenirs distributed at the banquet was a little booklet published by the Bridgeport Branch which is made up of talks to the platers given before the branch by F. C. Stanley, Ph. D.

Copies of the booklet can be secured by writing to the Secretary, Mr. N. A. Barnard, 858 Howard Avenue, Bridgeport, Conn.

JOINT CONVENTIONS AT CINCINNATI, OHIO

WRITTEN FOR THE METAL INDUSTRY BY KENNETH C. CARDWELL.

The joint convention of the American Society of Mechanical Engineers and the National Machine Tool Builders' Association, held at Cincinnati, May 21, 22, 23 and 24, was one of the largest and most successful ever held by these important technical organizations, and was, moreover, unusually interesting, by reason of the prominence of the men and trades represented in the manufacture of munitions, and the discussions had on the subject of the manufacture of munitions. More than 700 members and guests were registered at convention headquarters at the Hotel Sinton, including some of the leading men of the country in mechanical lines, while five former presidents of the Society of Mechanical Engineers were present, these being Messrs. John A. Brashear, M. L. Holman, James Hartness, Jesse M. Smith and Charles E. Billing.

The members of the two organizations were welcomed to the city on Monday evening by Mayor George Puchta, of Cincinnati, himself, in a measure, a member of the mechanical trades, through his connection with the Queen City Supply Company, a Cincinnati mill supply and machinery house. The mayor indicated the recognition now widely accorded to mechanical engineering and manufacturing work, saying in this connection:

"Men in your profession are needed by this country today as you have never been needed before, and to my personal knowledge, throughout the length and breadth of the land, no class of men is responding more quickly or more cheerfully to the call of the Government than are the engineers and the machine-tool men."

Dr. Ira N. Hollis, president of the American Society of Mechanical Engineers, and president of Worcester Polytechnic Institute, presided, and made fitting response to the mayor's address of welcome.

The extent to which the engineering profession is ready to work with the Government in order to enable its knowledge to be of service in the war is indicated by the records which have been prepared by Secretary Calvin W. Rice, of New York. Secretary Rice has a card index of the 8,000 and more members of the society under way, with full information about each member, in order that when a call is made for men with certain special knowledge, accurate data will be available for their selection.

The principal speaker of Monday's session was William Hard, a well-known magazine writer and authority on the war. Mr. Hard has recently been in England, spending a considerable period there, with unusual facilities for observation, and his remarks, directed especially to the practical problems of the war, pointed out the similarity of England's difficulties to those of this country, present and future. Declaring that one of the most important lessons to be learned from England's experience was that the management of the army and navy should be left in the hands of experienced army and navy officers, respectively, unhampered by civilians, he also said that the equally important work of supplying the fighting arms with munitions should be entrusted to civilians expert in their several lines. Mr. Hard prophesied that business will improve both during and after the war, for American and English manufacturers. Civilian control of munition production in England, he said, has proved so effective that England can now expend more munitions than her opponents, day after day, even without fresh supplies for a month.

J. B. Doan, of Cincinnati, president of the National Machine Tool Builders' Association, made the address of welcome on behalf of Cincinnati's engineers and machine-tool manufacturers on Monday, and pleaded for what he termed practical patriotism, indicated by the use of the best brains in the country for the development of means of assisting the Government. "I am confident," he declared, "that there will be no slackers in our ranks, and that with God's help we have started on the high road to victory and an enduring peace for all nations."

This, in fact, was the key-note of the gathering. The warlike tone of the convention was emphasized by the grouped flags of the allied nations, including the Stars and Stripes, above the rostrum, as well as by posters urging subscription to the Liberty Loan; and these, by the way, received an adequate response, as far as the two organizations were concerned, in the action of the two executive committees in subscribing $10,000 each to the bond issue.

Monday afternoon was devoted largely to visits to some of the city's great machine-tool plants, especially in the Oakley and Mill Creek Valley districts.

The principal address of Tuesday's session was that of Dr. Otto P. Geier, of Cincinnati, a national authority on the subject of the care of the health of factory employes, which he has worked out in his own plant. He asked for a real spirit of co-operation between capital and labor, employer and employe, in working out the problems thrust upon the machinery industry by the war, declaring that the war has lifted the problems of business into a higher plane. "The Council of National Defense has appointed a committee on the conservation of the health and welfare of the worker, and in the interest of the health and productiveness of labor, proposes to establish definite standards of plant operation," he said. "The human potential of the nation is needed at its maximum, for the country cannot afford the usual labor losses due to accident, disease, fatigue and industrial poisoning."

Dean Herman Schneider, of the College of Engineering of the University of Cincinnati, whose operation of the co-operative plan of engineering education has attracted world-wide attention, gave an illuminating discussion of this subject at the afternoon session, illustrated by stereopticon views, and incidentally pointed out the fact that the human element in manufacturing has become first in importance, instead of last. Organization and men have come to the front as factors to be studied and handled quite as skillfully and carefully as materials, he stated. Moving pictures showing the manufacture of shells were exhibited during the afternoon.

Munitions and their manufacture, the outstanding subjects of the convention, received virtually exclusive attention for the remainder of the meeting. On Wednesday Frederick A. Waldron, of New York, gave some striking figures indicating the volume which this branch of industry has attained in the United States as a result of the European war. He stated that more than a billion dollars has been expended in this country during the past two years on munitions, in spite of the fact that such products were at the outbreak of the war entirely new to American manufacturers as a whole. About 16,000,000 three-inch shells, weighing 400,000,000 pounds, comprised one item in the list, besides larger shells, rifles, heavy guns, rifle ammunition, and an infinite variety of other army supplies.

According to Lucien I. Yeomans, of Chicago, speaking on "Practical Wartime Shell Making," the idea of converting ordinary shops into munition plants is entirely impractical, for the most part. Instead, he declared that the Government should establish large manufacturing centers, especially designed for the production of munitions, and should supervise the entire operations there, turning out guns and munitions of all sorts in the quantities required, and leaving the other industries of the country to continue their operations. He suggested that such centers could readily be established at Cincinnati, St. Louis, Philadelphia, Cleveland, Minneapolis, Milwaukee, Birmingham, Chicago and other cities, to the number of ten or more, and declared that large plants could be constructed and equipped in these cities ready to produce shells inside of sixty days.

Women as workers in munition factories were stated by Arthur L. Humphrey, general manager of the Westinghouse Air Brake Company, of Wilmerding, Pa., to be in many cases more efficient than men, on account of their greater manual dexterity. Light, delicate work, involving both care and speed, found women especially fit, he said, pointing out, however, that the manufacture of munitions calls for an organization built around men who have had experience either in the identical work or in work of a very similar character.

Henry L. Coe, of Boston, supported the other speakers in maintaining that munitions must be made in separate plants, as an exclusive business, and not as a sort of side line to some other manufacturing enterprise. He declared that it is futile to try to handle the manufacture of projectiles as an appendage to some other business, and that it is a business in itself, the success or failure of which might depend upon the handling of apparently small and trivial details.

The immense value and military importance of the country's vast natural resources, especially in its metal deposits, was a

favorable factor pointed out at the Thursday section by C. B. Nolte, of Chicago, who said that of the world's supply the United States normally produces 40 per cent. of the coal and iron, 60 per cent. of the copper, 65 per cent. of the petroleum, 32 per cent. of the zinc and 33 per cent. of the lead, all of which are required in vast quantities for the manufacture of munitions and the conduct of a successful war. Mr. Nolte differed from other speakers in his opinion that many shops could readily be converted into munition plants, pointing out that watch-making, typewriter, printing, office equipment, scientific and electrical plants have been successfully adapted to the manufacture of shell plants, and that powder is about the only product needed in munitions which must necessarily be made in a separate plant.

Major Phillip S. Bond, of the United States Corps of Engineers, Cleveland, O., was another speaker on Thursday, the closing day, urging the necessity of close and complete co-operation on the part of all units of the country in order to achieve real efficiency in the conduct of the work of war.

The Committee on Resolutions, consisting of L. D. Burlingame, Providence, R. I., as chairman; John H. Barr, New York; Reuben Hill, Detroit; H. E. Harris, Bridgeport, Conn.; C. B. Hamilton, Toronto, Canada; J. B. Doan and A. J. Baker, Cincinnati, made its report on Thursday, a copy of which was sent to President Wilson, and to leaders in the Senate and House. Among the recommendations made was the standardization of all munitions and munition machinery, in order to obviate the delays and confusion caused by the use of different standards, an appropriation by Congress to provide standards and adequate means of calibration, distribution and supervision of such standards being asked for this purpose. Another resolution urged all manufacturers and engineers to co-operate "in the dissemination of information and the intercharge of data pertaining to methods of manufacture," and shop practice, with the object of fascilitating the production of munitions by making the best methods standard.

AMERICAN SOCIETY FOR TESTING MATERIALS

At the twentieth annual meeting of this society to be held at Atlantic City, June 26-29, 1917, the following subjects relating to metals will be considered at the fifth session, Wednesday, June 27, at 8 p. m.:

Report of Committee B-2: On Non-Ferrous Metals and Alloys. William Campbell, chairman.

The Testing of Sheet Brass. Charles H. Davis.

Specificationas and Inspection for Brass and Bronze. A. D. Flinn and Ernst Jonson.

Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion. W. Reuben Webster.

Effect of Light vs. Heavy Reduction in Cold-Working Brass. W. Reuben Webster.

The Hardness of Hard Drawn Copper Wire. Edwin H. Peirce.

The Electrolytic Determination of Tin on Tinned Copper Wire. G. G. Grower.

PERSONALS

ITEMS OF INDIVIDUAL INTEREST

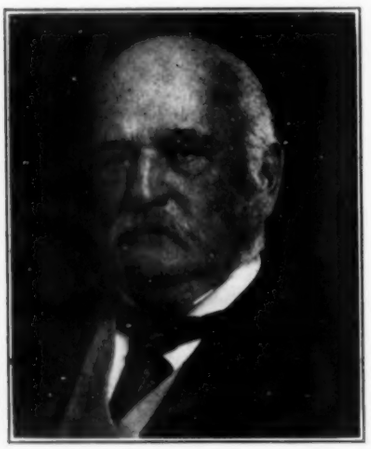
C. B. Willmore has become connected with the research department of the Scovill Manufacturing Company, Waterbury, Conn.

C. J. Rath is now connected with the Salem Brass and Bronze Company, manufacturers of various metal castings, Salem, Ohio, as manager.

DEATHS

CHARLES E. GREGORY

As announced in THE METAL INDUSTRY for May, Charles E. Gregory, president of the J. H. Gautier Company, crucible manufacturers, Jersey City, N. J., died at his home, No. 2 North Washington Square, New York City, at the age of seventy-nine. Mr. Gregory was born in Jersey City, N. J., November 15, 1837, and was educated at the Hasbrouck Institute in Jersey City and the Elizabeth Institute in Elizabeth, N. J.

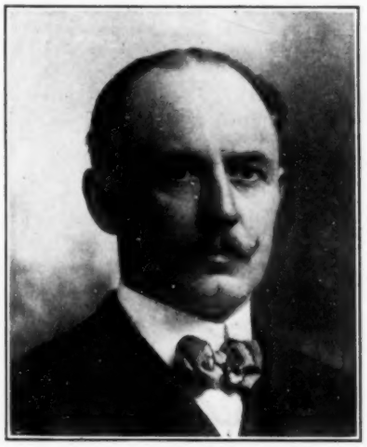


Charles E. Gregory

Mr. Gregory, when he was twenty years old became connected with the J. H. Gautier Company at the time of its founding in 1857 by Dr. J. H. Gautier. Mr. Gregory paid particular attention to the business end of the company, while Dr. Gautier was the practical man. At the time of his death Mr. Gregory had been in continuous service of the Gautier Company for sixty years and became president on April 1, 1895, after the death of Dr. Gautier. Mr. Gregory was, when he died, the oldest crucible manufacturer in the world.

EDWARD T. FRAIM

Edward T. Fraim, president of the E. T. Fraim Lock Company, Lancaster, Pa., died at his home in that city on May 2 after an illness that lasted nearly three years. Mr. Fraim was born in Lancaster in February 18, 1857, and therefore was in the sixty-first year of his age. When he was three years old he was taken to Dayton, Ohio, where he received his school education. When seventeen years old Mr. Fraim returned to Lancaster and was apprenticed to the jewelry trade in the establishment of E. J. Zahm. Following this apprenticeship, he founded the Keystone Lock Works in 1879, this business growing so rapidly that it was compelled to find larger quarters several times, and it was finally located on Park avenue, which is the present situation.



Edward T. Fraim

In 1906 the company was incorporated as the E. T. Fraim Lock Company and Mr. Fraim became president, which position he held at the time of his death. The original factory

was built in 1879 and consisted of the southern wing of the present main building. There are employed at the present time about three hundred men and the output of the factory is about 3,000,000 locks of a great variety per year.

Mr. Fraim was a member of St. Paul's Reformed Church, a director of the General Hospital, a member of the Pennsylvania Society of New York and member of a number of clubs. He is survived by a widow and two sons, Walter E. and Samuel R., both of whom were associated in the business with their father for a long time and who will continue to carry it on.

William Bergfels, head of the Newark Nickel Plating Company, Newark, N. J., and formerly pastor of the Elizabeth Avenue Baptist Church of Newark, died at his home, 13 Stanton street, on Friday, May 18.

TRADE NEWS

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

WATERBURY, CONN.

JUNE 4, 1917.

War has begun to have its effect on the industrial activity of Waterbury, already a most busy producer of materials for use in munitions as well as materials which are most commonly used in the homes throughout the land, and it is apparent that the splendid organization and efficiency of Waterbury industrial plants is likely to bear rich fruit as in past wars.

Just a few days ago the announcement came from Washington, D. C., that on the examination of bids for cartridge cases for the army the Scovill Manufacturing Company has been found to have the lowest bid and was to be awarded the contract. This is merely an indication of what may be expected as long as the United States government is in the market for equipment of this sort.

Local students of history can easily recall that the days of the Civil War were the days which saw this valley of the Naugatuck river make its first great strides forward industrially, commercially and financially. A few years before that war the Naugatuck railroad line had been completed and when the demand came for the various materials required of brass makers for army and navy equipment, it was this town that was found best equipped to make it and get it to the government. The railroad has often been credited with giving Waterbury its great advantage over the larger towns of that day, but the fact is that the greater population that was found here after the Civil War was a population of skilled and unskilled labor attracted here by the demand for men to work in the rapidly growing plants whose greatest development was due to war contracts. Waterbury's industries and those of the entire Naugatuck valley have been fundamentally peace-time industries from their very beginnings, but like the tools of peaceful industries they have been convertible in time of strife. The fancy buttons of the dandy merely give way to the buttons of uniforms; the brass sheets that are converted ordinarily into talcum powder boxes are turned into cartridge cases; and so it goes all along the line. Waterbury and the entire Naugatuck valley have always found that its predominating industries were ready chiefly for national service and so it is easy to account for the readiness of this section of the country to respond to duty's call.

There is still an extraordinary demand for machinery of all kinds here, which accounts for the continued drive of the business of all the machine plants, particularly the Waterbury Farrell Foundry and Machine Company, the E. J. Manville Machine Company, the Rowbottom Machine Company, Risdon Tool Works, and others in these lines. Likewise the Blake & Johnson Company, Berbecker & Rowland Manufacturing Company, Waterbury Foundry Company, and similar concerns find themselves constantly supplied with orders resulting from the activity in the machinery lines.

Domestic business is still flush. There are plenty of orders for all of the domestic products of this section. Pins, hooks and eyes, watches, clocks, domestic utensils, novelties, household materials and building materials and the metals that are used in their production by the special hardware producers, needles, buttons, shoe hardware, specialties, lamps, burners and all the domestic lines are reported to be active and with plenty of orders ahead. Likewise the special products, the tube lines, engines, motor and automobile parts, German silverware, silver and nickel goods are in demand.

Labor is still in great demand, but there is less pressure in this market than there has been. The indications are that there may be migrations this way, for there is a constant supply of men applying for work at some of the larger factories while smaller plants have to go hunting. There is some recruiting of labor outside of the city and this results in a carload or two arriving almost daily for the Chase Metal Works in Waterville. There is a constant changing about of men of the unskilled or partly skilled classes, which is a rather troublesome factor in the situation, but which has existed long enough so that it is considered routine now. Wages are still high and bonus scales have not been reduced.

Recently a vote was passed by the Chase Metal Works, the Chase Rolling Mills and the Waterbury Manufacturing Co. to incorporate as the Chase Companies, Inc. The news item is simply a report of the filing of the deeds in the Town Clerk's office—the placing on record of the incorporation of these companies under a new name.

The property on Grand street between Church and Leavenworth streets upon which the new office building of the Chase Companies is to be erected, as reported in THE METAL INDUSTRY, sometime ago, was secured piece by piece by Henry S. Chase or his agents, and has just now been transferred by him to the Chase Companies, Incorporated.

A subscription of $2,000,000 to the Liberty Loan of 1917 was made by the American Brass Company, and $1,000,000 subscribed by the Scovill Manufacturing Company, which brings Waterbury's announced total to $4,600,000.

All the manufacturers here are keen about the success of the Liberty Loan bonds and are co-operating with the banks in getting the issue floated. Despite their intensely active occupations in their own spheres there are few of the leading manufacturers who have not been pressed into service in some branch or other by the government. Without a grumble they have responded, regarding these calls, however inconsiderate of personal comfort they may seem, as calls to their duty as patriotic citizens which must be obeyed. The example they set to their fellow citizens and their employees is a splendid one.

Thus we find the American Brass Company, the Chase Companies, the Scovill Manufacturing Company represented in all movements for the safety and honor and protection of the nation. Cattle raising has been undertaken by the American Brass and the Scovill companies that the food suppliy of the State may be increased. All have well organized garden clubs and farm projects. Of course, the harvest of bonuses and dividends helps the employer and the employee both in work of this kind and care is being taken to see to it that investments of any surplus earnings are made wisely and where they will help the general public welfare. Charles F. Brooker and members of the Board of Directors of the American Brass Company recently concluded the purchase of six and two-thirds acres of land adjoining the company's branch plant at Kenosha, Wis.—F. B. F.

BRIDGEPORT, CONN.

JUNE 4, 1917.

Judging from the view taken by all those concerned in the silver business and allied trades in Bridgeport, there will be no serious falling off of business during the present year. All the silver factories of the city and the surrounding neighborhoods state that business at the present time is booming along as it

has been in the past and that they see no reason to think that it will dwindle as the year progresses.

The manager of the E. H. Smith Silver Company, when interviewed, said that they had some small difficulty in procuring the metal that they needed in their work, but aside from this trouble things were even a little above normal. German silver is the metal that they use mostly in their work, and it has proven a little hard to locate it during the past month or two. It is thought by the officials at the plant, however, that this condition is merely temporary and that the metal will be more plentiful in the near future.

The plant at the present time has all the business that it can very well attend to and has no trouble in securing more of it whenever needed. The war, they think, may curtail business to a slight extent, but not enough to cause any real deficit in the earnings of the plant. They have already enough orders to keep them busy until the last of October and anticipate no difficulty in procuring more when these are finished.

The Newfield Silver Company's manager is even more of an optimist than some of his contemporaries here in the Park City. He fairly radiated cheerfulness and confidence when interviewed. "No, I think that business is going to be even better than it has been here since we started. We have built this plant up from a little hole in the ground until at the present time the net earnings of the plant total over $100,000 a year. There are no labor troubles at the plant, the eight-hour law being enforced down to the sweepers. As with all the other shops in the city, there was in the past some difference between the employers and the employes, but the enforcing of the eight-hour law and an adjustment of the wages smoothed all these difficulties over in fine style." The present business of the company is greater than it has ever been and the manager looks for it to increase month by month as it has done in the past. Not since the company first started, stated the manager, has a single month failed to show an increase over the preceding month or an increase over the corresponding month of the previous year. The company has been in existence not quite five years, being started on July 28, 1912.

The Bridgeport Brass Company has all the work that it can handle at its plant on East Main street. In fact the company has been forced by the increasing business that it has had during the past year to erect a large addition to the Union branch on Housatonic avenue. Mr. Webster, vice-president of the company, happened to be out when THE METAL INDUSTRY's representative called, but it was stated by several others in the plant that there was absolutely no danger of the war interfering with the plant's business during the coming season. It is thought that by next month the Brass company will have more definite news as to its improvements and business.—L. M. P.

NEW BRITAIN, CONN.

JUNE 4, 1917.

With the exception of a disastrous fire which totally destroyed the P. & F. Corbin division, known as the P. & F. Corbin Annex, a large iron foundry, there has been but little of interest occurring among the various metal manufacturing concerns during the past month. Business has progressed as usual, but no extraordinary strides have been noted, nor have any exceptionally big war orders been placed here so far as is known. Practically every concern in the city is contributing men, money and land to increase the food production of the country, and these same factories are urging their employes to purchase Liberty Loan bonds, and are even going so far as to arrange for the purchase of the same on an instalment basis. These, in brief, comprise the activities since last month.

The fire which razed the P. & F. Corbin foundry occurred on the night of May 21. The fire was discovered shortly before midnight, but despite special watchmen and guards it had gained sufficient headway by the time the alarm was sounded that it was evident the entire plant was doomed. As most of the foundry plants, stretched over considerable territory and located in ten or a dozen different buildings, were of wooden construction they made easy prey for the flames. By making a curtain of water from a score of hose lines, the firemen were able to save the huge brick storage vault where valuable and indispensable patterns and working models were kept. There were, however, a large number of the master patterns and models on the work floor and these were destroyed. About 200 hands were employed at this foundry, and what men have not been placed elsewhere by the factory officials are being sent home and advised that their pay will continue as though they were working. Although Factory Manager James Fletcher is at this time unable to state what the loss is, he admitted that $175,000 is not an unreasonable figure.

There is little doubt but what every concern in the city is doing some governmental work, but because the nature of the local factories is such, most of their work would be on parts and on sub-contracts. The New Britain Machine Company has received a big sub-contract from the Waterbury Tool Company, formerly of this place but now of Waterbury, Conn. This order, taken in conjunction with other large orders of a private nature, officials say, will necessitate the factory returning to a twenty-four-hour working schedule. The war contract is for the machine work on fifty hydraulic speed gears which are made almost exclusively by the Waterbury concern and which are used extensively for ammunition hoists on ships and in forts, for elevating and lowering heavy guns, for turning the turrets on battleships and for operating the steering mechanism of these big boats. North & Judd are also handling government contract for cavalry and infantry accoutrements, such as buckles, etc.

Among other concerns operating in this city, the Stanley Works, the Union Manufacturing Company, the Landers, Frary & Clark Company and the United Electric Light & Water Company have devised means whereby their employes may purchase Liberty Loan bonds and pay for them on the instalment plan, the money to be taken from their wages under a mutual agreement. The Stanley Rule & Level Company, the Stanley Works, the American Paper Goods Company, Hart & Hutchinson, the Skinner Chuck Company, Landers, Frary & Clark and several other concerns have turned over to their employes who desire it, large plots of land which are being tilled and planted on a co-operative basis.—H. R. J.

PROVIDENCE, R. I.

JUNE 4, 1917.

There is little, if any, change in the general situation and conditions as regards the various lines of metal industries in this city and vicinity. While perhaps not rushed to such an extent as at times during the past two years or more, there is no necessity for any one desiring work to be idle. Such concerns as are engaged in the manufacture of munitions or supplies continue to be driven to capacity and the number of them located in and around Providence is astonishing. The list of such concerns recently published by order of the Attorney General's office at Washington was a revelation, as few persons were aware of the extent to which "war" orders were being handled here.

The future outlook continues bright with the exception of the manufacturing jewelry industry. That has experienced a decided slump which the increasing war cloud does not have a tendency to improve. Several weeks of rush was enjoyed by the jewelers on flags and other patriotic emblems which gave the enamelers, colorers and other kindred trades all they could swing to, but demand has been fully supplied and there is nothing now that is giving any impetus to the business.

In accordance with instructions from Washington the United States Marshal recently issued a list of manufacturing concerns in Rhode Island, now engaged upon Government contracts, within half a mile of which unnaturalized Germans are forbidden to go after June 1 without a special permit from the Marshal's office. Included in this list are the following: Allen Fire Department Supply Company, Providence; Collyer Insulated Wire Company, Pawtucket; D. & W. Fuse Company, Providence; The J. M. Carpenter Tap & Die Company, Pawtucket; Brown & Sharpe Manufacturing Company, Providence; Rhode Island Tool Company, Providence; Holbrook Raw Hide Company, Providence; Nicholson File Company, Providence; Gorham Manufacturing Company, Providence; American Supply Company, Providence.

H. J. Astle & Company of this city is installing several of the Boland systems for polishing, coloring, ventilation, blowers, etc., in the new factory of the Queen City Watch Case Manufacturing Company, at Cincinnati, Ohio, which will be one of the largest factory plants in the Middle West when completed. The Astle

Company is also making a shipment of a Boland system to a foreign country which will require a hundred days' journey if made on regulation time.

The Secretary of State has received from the Standard Nut and Bolt Company, of Valley Falls, R. I., a statement that the capital stock has been increased from $100,000 to $200,000. The concern, it is stated, plans no building operations, but that the additional funds are required to meet the cost of considerable new machinery and other recently acquired equipment.

Simpson-Brainerd Company, manufacturing jewelers, have removed from 9 Calender street, and E. A. Bennett & Co., manufacturing jewelers, have removed from 14 Blount street to 92 Niagara street.

Thomas D. Bennett, Sidney J. Henhenran and Charles E. Fisk, all of Providence, have been incorporated by Secretary of State Parker under the laws of Rhode Island as the Fisk-Bennett Company, with an authorized capital of $10,000 to do a general jewelry and chain manufacturing business.

A final dividend of 19½ per cent. has been declared in the case of Albert W. Read, of Providence, formerly in business as the Globe Sheet Metal Works, by Referee in Bankruptcy Nathan W. Littlefield. This will make a total of 22½ per cent., amounting to about $400, received by the creditors in this case.

Louis A. Sturdy, formerly with Sturdy Brothers, Chartley, Mass., has started in business at 9 Calender street, this city, and will make an electroplated line, but is now getting out a temporary line of flag goods.

Levi J. Perkins, the electroplater of the R. E. Sturdy Company, has bought out the interest of his partner, Richard Rosa, and will continue the business as heretofore at 190 Eddy street.

Articles of association have been filed, under the laws of Rhode Island, with Secretary of State G. Frederick Parker by George W. Dover, Inc. The corporation has a capital of $20,000, and is to do a general machinery and tool manufacturing business in this city. The incorporators are George W. Dover, Benjamin Peckham and Frederick H. Blatchford.

Lodowick H. Tillinghast, president and founder of the L. H. Tillinghast Supply Company, manufacturers, wholesale and retail dealers in plumbers' and sheet metal workers' supplies, 162 Dorrance street, Providence, R. I., died at his home, 211 Adelaide avenue, that city, on Wednesday morning, May 22, as a result of a shock suffered on the previous Sunday.

Walter W. Griffith, vice-president and assistant general manager of the Nicholson File Company, of Providence, R. I., long connected with that corporation in various executive positions since 1898, died at the Hope Hospital on May 15, following a comparatively brief illness. He had been in poor health for the past few months, but at intervals had been able to be at his office and attend to his duties.

The Eastern Bolt & Nut Company is erecting a new machine shop on Aldrich street, East Providence. The building will be 50 feet front and 200 feet deep of two stories, of reinforced concrete, steel sash, iron trusses and a tar and gravel roof.

Frank N. MacLeod, Norman D. MacLeod and Colin G. MacLeod of Providence and Elmer E. Dawson, Jr., of Boston, have been incorporated under the laws of Rhode Island as the Abrasive Machine Tool Company, with a capital stock of $150,000.

A new machine shop is to be erected in Arlington for the Langelier Manufacturing Company to be two and three stories high, of brick, mill construction, 191 by 133 feet with rolled steel sash.

W. H. M.

BOSTON, MASS.

JUNE 4, 1917.

H. C. Estep, chairman of the committee of the American Association of Foundrymen, visited this city early in the month and conferred with the New England association relative to the convention to be held in Boston in October. While no definite plans were made, the various technical papers to be read at the convention were submitted by Mr. Estep and arrangements made for their delivery in the morning and afternoon sessions according to a schedule now in preparation. Plans are being made by the New England association for the disposition of booths at Mechanics building, and the indications are that the displays will exceed all previous efforts at national conventions. The building is one of the largest in the country and offers opportunity for exhibitions of this kind with unsurpassed facilties. Furthermore, it is ideally located, being right in the center of an ever-increasing business district and situated in the midst of the educational, technical and art establishments.

The local manufacturers in general are very busy at the present time, but a number of smaller concerns, jobbing and repairing shops seem to be in need of business. There is practically nothing in the line of munition work being done now around Boston. Contracts have all been closed, but the chances are that within a short time there will be a number of new contracts awarded.

The regular monthly meeting of the Metal Trades Association was held at Young's Hotel, Boston, June 6, when Dr. Ira N. Hollis, president of Worcester Polytechnic Institute, spoke on the preparedness movement.

There is a great deal of disturbance among the manufacturers over the question of the draft, because a large number of them employ men who are eligible, and they are much afraid these men will be taken. The main trouble seems to be that there is no definite idea as to what is and what is not an essential industry for the prosecution of the war. The foundries and factories producing machine tools, etc., can be of immense service in speeding up the production of munitions, but as they do not come under the classification of munition factories, the workmen would not be included if the exemption were confined strictly to plants producing munitions of war. On the other hand, disrupting the organization of factories would affect the production of munitions fully as much as a decrease in the production of steel or of coal.

The general feeling seems to be that the problem will be handled during the ten days intervening between the registration and the actual drafting, but the fact that this information has not become public property, particularly among the mechanics, is causing a great deal of unrest, and has had the effect of encouraging enlistments among men wishing to avoid being drafted. While no details are available regarding the method of determining what workmen should be exempted, it has been suggested by men who have studied the question that a board in each locality, consisting of prominent manufacturers should be appointed to determine the standing of each factory in the community, and upon that basis grant exemption to the firm and at the same time to the individual employees. The process of registering mechanics is too laborious for the short time allowed, and although it is the only systematic method of handling the question, it is not practicable at the present time.

Manufacturers feel very strongly that all eight-hour limitations on the production of government material should be entirely discarded in the present emergency. Boston concerns have protested against the clause which makes it necessary for all industries working on war materials having to pay time and a half for overtime.

Boston industrial leaders were prominent in the movement which resulted in the recent amendment to the war tax bill, by means of which a restrictive tax on incomes earned during 1916 was eliminated. The manufacturers are also strongly opposed to any form of double taxation which is inevitable under the proposals for taxing corporations earning at the source and also on the income of the investor.

During the past legislative year there has been a prominent showing of industrial chiefs from all parts of the state at committee hearings on bills affecting the industries. The bill which probably caused more opposition than any other during the year, or in fact several years, was the report of the joint recess committee on workmen compensation insurance rates. The manufacturers were successful in heading off this piece of monopolistic legislation, but only after continued efforts, in which the state house committee rooms were filled with hundreds of manufacturers.

Industrial heads in Boston and vicinity are at present considering the possibility of putting women into the factories as operators, and while nothing definite has been accomplished along this line, it is quite probable that within the next six months a fair proportion of machines will be operated by female labor.—R. T. E.

ROCHESTER, N. Y.

JUNE 4, 1917.

The metal situation in this city and immediate vicinity at the present moment is in a chaotic state. Until it is definitely known what Congress proposes to do in the matter of taxes and the imposing of a new schedule of tariff duties on materials imported from Canada and other countries, large users will be at a loss to know which way to turn. It is a well-known fact that a number of tonnage contracts with Canadian concerns have been held in abeyance or declined for the express reason that the local men do not know what way Congress is going to act.

Rochester metal users have got to wait to see just what will be done. Therefore, there is no general line of major activity in a metal way. It is entirely of a minor character. Local business is being cared for, and leading manufacturers say there is no big business anticipated for awhile.

Much interest is taken in the immense loans being made to the Entente Allies. It is anticipated that the great bulk, if not all, of the money so advanced will be spent in the United States. It will help a lot. When the tax propositions have been fixed by Congress and the tariff adjusted, with the stimulus of new business from the Allies, manufacturing conditions should soon get back to another high level. But it will be a new level altogether. As a big metal dealer quoted a poet today: "The bird with the broken pinion will never soar so high again."

Rochester metal users are unanimous on one point, and that is that the scrap metal men should receive more consideration and encouragement from the tariff junkers in Congress. The scrap metal men are the natural conservers of the material resources of the country. Without their efforts there would hardly be a metal industry today but that would be in an impoverished state.

The matter of car shortage here has improved somewhat during the past month. There is also a marked improvement in the way of obtaining coal, and altogether the metal men are becoming more optimistic.

All of the base metals are strong and firm. Copper is firm, and there is a natural scarcity of by-products. Metal for castings is quoted here at 30.50 cents, and 32 to 32.25 cents for electrolytic and lake. Red brass is firm and obtainable at 28 to 30 cents, with yellow held at 20 to 22 cents. Zinc scored a slight advance in price during the past few weeks, being quoted now at 7 to 7½ cents for scrap and 10 cents for pig. Spelter is active and firm, and held at 36 to 45 cents. The local market for aluminum is strong, with prices ranging about 60 cents. Babbitt metal is an uncertain quantity and prices are not quotable. Lead is very strong, with scrap held at 9 to 9½ cents, and pig at 11 to 11½ cents.

Eastman Kodak Company announced early in the month that its net profits for the year 1916 were $17,000,000. This vast amount is the largest in the company's history, and indicates what a tremendous increase in the use of metals has taken place in this one big concern.—G. B. E.

DETROIT, MICH.

JUNE 4, 1917.

While other lines of business seem to show signs of a slowup, the brass, copper and aluminum trade is good, with prospects of continued prosperity excellent, nothwithstanding the effects of the war. It is learned that many concerns in this line are engaged in the manufacture of munitions. A number of large contracts are reported, but announcement as to what concerns are engaged in this line is not generally made public. It is needless to say that the brass, copper and aluminum business has a great future, and that plants which two or three years ago were running close to the wall are now becoming prosperous. The greatest difficulty at present is inability to obtain coal readily and prompt delivery of supplies. Railroad transportation is seriously handicapped, although lake navigation is relieving the situation to some extent. The automobile companies still are forced to send cars overland for hundreds of miles in every direction from Detroit.

L. D. Moss, of the Peerless Iron & Metal Company, which deals largely in brass, declares this is going to be the greatest year in the copper, brass and aluminum business ever known, in spite of the prevailing prices and the demand which keeps ahead of the supply.

The automobile companies, which use vast quantities of brass, copper and grey iron, still continue to keep up their high record in production. The Ford, Cadillac, Packard, Studebaker, General Motors Companies, the Hudson and Chalmers, all report extensive orders that will consume all their time for the next half year. Some concern is expressed regarding the labor situation as soon as the Government begins to draft. Great numbers of skilled mechanics and engineers are employed here, and it is believed the war draft will make heavy inroads into the ranks of these valued employees. Even at present it is hard to obtain all the help desired in this line.—F. J. H.

CHICAGO, ILL.

JUNE 4, 1917.

The general business situation in the metal trades is very encouraging along the line of sustained progress, production being the heaviest known and new demands equaling the best heretofore.

Readjustments imposed by war activities have become urgent in some branches and the cooperative effect is more distinct in preparing for unusual needs. These changes are effected without loss of capacity or much incidental trouble and the outlook indicates a very satisfactory period of gratifying activity although there is yet uncertainty as to adequate labor supplies and transportation.

There have been some large government contracts let this past week to Chicago concerns manufacturing brass plumbing supplies covering shower heads and a general line of lavatory supplies to be used by the government at mobilization or training camps throughout the country.

The requirements are on a large and up to date scale showing the precautions that are being taken and modern up to date equipment that will be installed from a sanitary and healthful condition and welfare of the men that will occupy these camps.

The specifications call for a special date for these goods to be delivered on, therefore requiring the plants to give this class of goods the preference.

Chicago is becoming quite an automobile accessory manufacturing center and business along this line is developing rapidly.

The Stromberg Motor Devices Corporation, manufacturers of the Stromberg carbureter, are building a four story addition to their factory, located at East 25th street, which will greatly increase its facilities for production and allow it to develop and place on the market new devices.

The Johnson Automobile Lock Compay, East 24th street are very busy.

The Fowler Manufacturing Company located at East 24th street is now making a specialty of automobile lamps and has devoted its entire plant to the manufacture of same.—P. W. B.

CLEVELAND, OHIO

JUNE 4, 1917.

M. Cohen & Sons Company, old metals, has purchased six acres in the Collinwood District from the Manufacturer's Realty Company, and will erect a modern factory. The Chisholm & Moore Manufacturing Company, 5040 Lakeside avenue, metal products, has taken an option on 30 acres in the same district near the plant of the White tractor plant. This is in the same new industrial section where work is going rapidly forward on the plant of the Cleveland Brass & Copper Mills, Inc. Nearby the Jordan Motor Company, which recently doubled its capacity, has taken a part of the Dann Products building, for one year, indicating that this firm will undertake building operations which will give it ample floor space for its own uses before the year is up.

The Cuyahoga Stamping & Machine Company has sold three and three-fourths acres of land improved with three buildings having a total floor space of 60,000 square feet, to the Scientific Heater Company, which will move there from its present location in the Whitney Power Block, Frankfort street, June 1. The price was $90,000. There is a double Nickel

Plate switch through the property. The Scientific Heater Company expects to expand this floor.

Word has been received here of the death on May 18, of A. P. Turner, president of the Canadian Copper Company, at his home at Oakville, Ont. Mr. Turner was formerly active in Cleveland as first secretary of the Colonial Club, a member of the University Club, the old Gatling Gun battery and other organizations. He left Cleveland several years ago to become president of the Canadian Copper Company.

Washington S. Tyler, pioneer Cleveland manufacturer and president of the W. S. Tyler Co., ornamental iron and bronze, died May 27, 1917, at the Hotel Statler, at the advanced age of 82 years.

Mr. Tyler was born in Ohio City, now the west side of Cleveland, April 12, 1835. He was sent to attend public schools in Connecticut and in 1850 entered the mercantile business in Hartford, Conn. He returned in 1853 and became a partner in the E. I. Baldwin & Co. In 1873 he organized the Cleveland Wire Works which was incorporated in 1884 as the W. S. Tyler Wire Works Co. The name was changed to its present form in 1899.

The W. S. Tyler Company is capitalized at $1,000,000, employs 1,100 men, and occupies many buildings on a large acreage in the heart of the city extending through from Superior avenue to St. Clair avenue, bounded on the east by the elevated tracks of the Pennsylvania Railroad. The plant is given over to the casting and working of iron and non-ferrous metals.

Mr. Tyler was prominent in philanthropy, being trustee of the Children's Aid Society, Lakeside Hospital, a member of the governing boards of Western Reserve University, Hiram House, Old Stone Church, Adelbert College, and the Workingman's Loan Association; director of the Commercial National Bank and member of the Union, Clifton and Roadside Clubs. When stricken he was preparing to depart with his wife for "Woodside," his country home near West Park. He is survived by his window and a daughter, Mrs. Elizabeth C. T. Miller.

Cleveland will be the mecca of the country's metal trades during June. Following are among the 15 conventions scheduled to meet in Cleveland this month: The Ohio Sheet Metal Contractors Association, the National Sheet Metal Contractors Association, the International Stereotypers and Electrotypers Association, and the National Association of Brass Manufacturers.—C. C. C.

CINCINNATI, OHIO

JUNE 4, 1917.

With the steady increase in the Government's orders for war purposes, and the certainty that immense quantities of munitions will be required for the United States army, as well as for continued supplies for the Allies, prospects for the consuming trades in the metal industry could not well be for greater activity than is now the case. Local machine-tool plants are loaded with work, and are making preparations to increase their output to greater volume than ever before, and the foundries are correspondingly busy. While there was something of a lull during the first part of the year, the foundries have as a matter of fact had hardly a breathing space, and now prospects are for the greatest activity yet experienced. The trades involved are fully aware of the seriousness of the duty imposed upon them, and are without exception ready to do their utmost to meet the responsibility. The condition of the railroads and the tangle in which transportation facilities have been cast by the immense traffic which they have had to handle, is perhaps the most serious difficulty confronted by the industry, in common with other trades, and unless there is some relief the summer is certain to see even greater congestion than is now the case. Already the manufacturers are complaining of difficulty in getting raw materials, while, on the other hand, the movement of cars with finished goods is slow, even after the cars are received, which is always a long time. Labor conditions are fairly good, although there is the usual shortage of skilled men, and many machine-tool manufacturers are experimenting with new men, with good results.—The newly-organized Acme-Greaves Company, recently formed by the consolidation of two leading Cincinnati machine-tool concerns, has made plans for the construction of a plant in the Oakley district, to cost $200,000, and with 100,000 square feet of space. The necessary ground has been acquired and work will be pushed forward with all possible speed.—The use of platinum in the manufacture of jewelry will not be eliminated by the war, according to Arno A. Dorst, president of the Wholesale Jewelers' and Manufacturers' Association, although the jewelers will not use the metal for large ornaments, in view of its importance for other purposes.—K. C. C.

COLUMBUS, OHIO

JUNE 4, 1917.

The metal market in Columbus and central Ohio territory is firmer than a month ago. Demand for all varieties has stiffened up with no appreciable increase in the supply. As a consequence all prices are stronger and prospects are for even higher levels in the near future. All of the metal-using concerns are buying liberally, but mostly for the present, as they are loath to accumulate stocks under present extraordinary conditions. Some new metal-using concerns have been opened in Ohio territory during the past fortnight. The car shortage is holding up shipments and as a result spot orders are held at a premium. In fact premiums are freely offered if shipment can be guaranteed.

Brass is firm in all localities, and there is a good demand reported. Red brass is selling at 26 cents, while yellow brass is quoted at 20 to 21 cents. Copper is also strong, and scrap is selling at 28½ to 29 cents, while ingot is quoted at 32 to 33 cents. Aluminum is firm in every locality and is selling at about 55 cents for scrap. Zinc is weaker and prices show a decline from a month ago. Tin is strong and is selling around 65½ to 67 cents. Other metals, especially type stocks and babbitt, are extraordinarily strong and scarce.—J. W. L.

WASHINGTON, D. C.

JUNE 4, 1917.

During the last few weeks a great deal of light has been thrown on the whole question of our national supply and need of platinum, and on the whole the prospect is very encouraging. The hysterical cries of a platinum shortage are subsiding—though everyone wishes that we had more of the stuff—as it becomes plain that there is enough metal on hand or available for our war purposes, as well as for more peaceful ends. No doubt the present concern over platinum has done much good in bringing to light unexpected sources, etc., as well as in bringing the various users of the metal into an understanding of each other that they would perhaps never have acquired in any other way.

A clear statement of what the situation has worked itself out to be is contained in the following excepts from a letter written by Mr. Meyer D. Rothschild, chairman of the Platinum Committee of the manufacturing jewelers. The letter states facts that can readily be verified by applying to the Secretary of Commerce or to the Geological Survey of the Department of the Interior. It is addressed to the Hon. Nicholas Longworth, who has addressed the House of Representatives on certain phases of the platinum question.

> " . . . First: The Government does not require any platinum whatever for war purposes.
>
> "Second: The Government has a stock of platinum on hand which is being recovered monthly in the mints, and which the Government is willing to sell to Government laboratories needing it for Government uses, and to outside laboratories, at the market price, with the understanding that it is to be used for the purposes of the Government.
>
> "Third: There is available from domestic stocks in the hands of dealers in platinum and others, considerable quantities of platinum which can be purchased by the Government or makers of acids, or chemists, or other people requiring platinum at any time.
>
> "Fourth: There are substantial stocks existing abroad, available to our Government.
>
> "Fifth: There is a reserve stock of platinum in the United States (including such things as chemical ware and jewelry in private hands) which could be obtained in a great emergency, amounting to from ten to twenty times the entire amount of platinum now in use by the makers of munitions; that is, by the makers of concentrated sulphuric acid.
>
> "Sixth: The entire stock of platinum now in use and the largest ever used in the United States for con-

centrated sulphuric acid is about forty-four thousand (44,000) ounces. This platinum is not destroyed in this process and loses less than one per cent. The reserve stock of platinum held by these munition plants can be employed for enlarging the plants if necessary.

"Seventh: The Jewelers' Committee, who took up the question of conserving platinum with the Department of Commerce and other Government departments, voluntarily agreed to cut out the use of this precious metal for heavier articles of jewelry and for jewelry findings and unnecessary parts, notwithstanding the fact that they were convinced, and so stated, that there was no shortage of platinum for war purposes.

"Eighth: The conferences with the Secretary of Commerce and Government officials, brought out the fact that there was a persistent effort on the part of certain people to 'bear' the price of platinum, and to that end wilful misstatements of fact are being published and a regular press campaign undertaken to discourage the buying of platinum by patriotic women, with the avowed purpose of cheapening the price of platinum to chemists, who have always been able to buy all the platinum they required at the market price; that is, at the same price that jewelers and others had to pay for it. . . .

"Platinum is not selling at higher prices in this country than it is in Europe, and notwithstanding the use of platinum for war purposes in Europe, platinum is being used for the making of jewelry in France and England. . . ."

Secretary Redfield himself is sending out the following letter to all who write to him with inquiries on the subject:

"Department of Commerce, Office of the Secretary:

"My Dear Sir:

"In response to your inquiry, let me say that a supply of platinum is available to the Government from several sources:

"First, from domestic stocks of which a census is now being made and which it is known can be increased if need be.

"Second, from stock now held by the Government which is available for sale to Government laboratories needing it for Government uses and to outside laboratories at the market price with the understanding that it is to be used for the purposes of the Government.

"Third, from stocks existing abroad known to be available.

"No campaign said to be based upon alleged needs of the Government can therefore now be properly made looking to the restriction of the use of platinum in jewelry further than the jewelry trade has already voluntarily gone, as expressed in the resolutions adopted by them and which this department has published with its approval.

"Yours very truly,

"WILLIAM C. REDFIELD.

"Washington."

All this, of course, is most encouraging to the platinum users; in addition the problem will be further cleared by the greatly renewed interest in those alloys and other substitutes that can be used to advantage in the electrical, chemical and dental fields.

C. M. H.

LOUISVILLE, KY.

JUNE 4, 1917.

The larger brass and copper working shops of this district report that business for the past month has been unduly quiet. The high cost of materials of all kinds has stopped a number of large building projects which were under consideration. High grain and prohibition talk has stopped all distillery operations, and at the present time there is very little work being done in this district that requires the services of the copper or brass workers. Louisville has not been fortunate enough to land much war order business, and about the only contracts that have been handled locally were for harness, boxes, etc.

However, several of the local coppersmiths are looking forward to the placing of orders for copper work on ocean-going vessels. It is alleged that the proposed building campaign is so large that the coast copper workers will not be able to cope with the great demand that will present itself for machinery, tube work, etc., and that some of this business is bound to come inland.

Local workers are especially interested in plans for building light draft ocean-going vessels at the Howard Shipyard at Jeffersonville, Ind., directly across the river from Louisville. It is claimed by the operators of these yards that they can build flat-bottom vessels of considerable tonnage, and take them out through the Ohio and Mississippi rivers, either on high or flood stages in the rivers. During low water the vessels could not be taken out with machinery, and during high water the machinery installations or ballast would be necessary in order to get under the bridges. A reorganization of the Howard company, with a capital of $4,000,000, is now being discussed, and in case the deal goes through it is thought that it will bring a lot of business to the copper workers of the Louisville district. It is claimed that ocean-going vessels are now equipped with refrigerating and distilling plants of their own, and also a great deal of special machinery where brass and copper work is necessary.

Matt Corcoran, Jr., head of Matt Corcoran & Company, local copper workers, states that while the company has no large contracts in hand, the aggregate of small orders is sufficient to keep the company going rather steadily, and all men are kept busy at the present time. This is one of the few concerns which is busy in the Louisville district.

The metal market as a whole has been fairly firm for the past sixty days. Sheet copper delivered in Louisville is worth about 42 cents per pound, base price. Tubes from a base price are quoted at 47½ to 48 cents, and ingot copper at 31 to 33½ cents. The demand locally has been quiet, although some material has been moving to automobile and other manufacturing plants. The Louisville & Nashville Railroad Company has been buying considerable material in the past few months to take care of some large car-building operations in its local shops, and those at Decatur, Ala.

The Love Foundry & Machine Company, of Winchester, Ky., which employs about fifty men, is now operating its own commissary department, and supplying its hands with food and clothing at actual cost. The company is also installing a co-operative garden, and will supply vegetables to its workmen at actual cost of production.

Announcement has been made to the effect that the Hart Manufacturing Company, of Grand Rapids, Mich., has applied for a Tennessee charter, with a capital of $60,000, and will move its brass and copper working plant to Knoxville, Tenn., where it will manufacture heating and ventilating systems, sanitary drinking fountains and other goods. The company is moving to Knoxville in order to reach cheaper coal, and at the same time a good supply of copper and other metals.—O. V. N. S.

TRENTON, N. J.

JUNE 4, 1917.

Trenton manufacturers are beginning to feel the effects of the shortage of help because of the fact that some of their employes either had to quit work after being members of the National Guard, or stop work to join some Federal service. In the National Guard are men of various trades, and many of them are metal workers who have to do their "bit" with the rest of them. Men who were earning good wages in the metal industry were compelled to give up that work and become regular soldiers. The war has caused a demand for metal goods of various kinds. Automobiles, vessels, etc., need all kinds of metal devices, and the Trenton plants are busy turning them out with what help they can secure. The conscription law will hit the Trenton plants also, as there are about 12,000 young men of conscription age in this city. Many of these are employed in metal industry plants and will, of course, have to register and respond to the colors. This order will not affect the plants until early in the fall. Besides having to pay high wages, the Trenton manufacturers also faced a serious situation in the matter of fuel during the past month. Buckwheat coal was used principally in the plants and when this became scarce pea coal was substituted in its place, the latter being more expensive fuel. Then came the shortage of pea coal because of the embargo on that fuel. This resulted after a battle between the Lehigh Valley and Pennsyl-

vania Railroad companies. The larger Trenton coal dealers then got together and sent a committee to New York to confer with railroad officials. The embargo was just lifted in time to prevent some of the plants from closing down.

Copper, Brass and other metals continue to bring a good price from the junk dealers, and they are buying all they can.

After it had been announced that the United States Government would take over the Bordentown (N. J.) plant of the Standard Fuse Corporation, the plan fell through for the time being. It is likely that the plant will be placed in operation later on. In the meantime the former employes are holding down positions in munitions factories in the different towns. Some have gone as far as Canada, where good wages are being paid. Many girls and young women were employed on the metal time fuses at the Bordentown plant, and they will have no trouble in finding good positions of a similar kind should the Government get busy and make munitions.

Business has taken a big drop at the Jordan L. Mott plant because of the completion of the third and last of the big orders for munitions for the European nations. The last order has been completed, with the exception of assembling some of the time fuses and the shipment of the same to the Bethlehem Steel Company, where the finishing touches are added. Many of the munition workers have been laid off, while some have been assigned to work in the other departments of the Mott works. The other departments are busy and brass workers were badly needed on general work. Those who have been working piecework on munitions find a big difference in wages in the other departments. Some of the more efficient munition workers earned as high as $40 a week, while one man alone managed to average $50 a week. When the first war order was received the Mott company erected a big addition and installed six oil-heating furnaces, which were used solely for the manufacture of brass for fuses. Fuses were also made in the other departments. The brass shop was "doubled up" and every inch of available space utilized for the war orders. Automatic machines for cutting brass were also installed and new lathes for brass erected. A 500-foot railroad spur had to be built to connect with the brass department and over this was shipped the fuses. The company also raised the roof of the brass shop and installed extra blowers for the health of the employes. Four of the new furnaces have now been removed to make room for other work. Considerable brass was used in the manufacture of the munitions. The Mott plant is now well equipped with machinery for the manufacture of munitions in case the United States Government places an order with the company for this kind of work.—C. A. L.

NEWARK, N. J.

JUNE 4, 1917.

Business conditions at the present time are a little uncertain. With the price of the necessities of life constantly going up, and doubt as to what the future has in store, many hesitate to purchase anything but what they actually need. This affects business adversely, and to some extent is reflected in the metal industry. Jewelry, silverware, brass novelties, etc., show a decrease in the volume of business during the past few weeks. Business remains fair, but is not near up to what it was a few months ago. The jewelry trade seems to feel the uncertain condition of business more than other lines, jewelry being a luxury. Manufacturers of metal goods other than novelties or luxuries are doing quite well, some of them very well. Platers report business keeping up quite well, though without the life and vim of a few months ago. A number of Newark metal manufacturers and electro-platers are working on war supplies of different kinds. Some of this work is on military supplies, and other on goods not distinctly military in their nature, but which will be put to military purposes.

Baker & Company, platinum manufacturers at Murray and Austin streets and New Jersey Railroad avenue, report that business is fairly good at the present time, though it has fallen off a little during the past few weeks. It is busier in the setting department than in its regular platinum line.

J. J. Jackson, silver rollers at 158 Astor street, reports business a little slower since the United States entered the war than it was before, although that concern is quite busy most of the time. Silver now keeps about 76, although the price fluctuates a little from day to day.

Henry Bergfels, of the Newark Nickel Plating Works, 42 Walnut street, states that the uncertainty due to the international situation has caused business to drop off considerably, though his concern has kept busy up to the present time and he has good prospects.

John L. Merrigold, of the Merrigold Electro-Plating Company, 97 Chestnut street, states that his company is now plating military goods. Business in general keeps up, though there is not as great a volume of work coming in as there was a few weeks ago.

Hugh Baxter, of the Hugh Baxter Plating Works, 353 Mulberry street, reports that business is very good with him at the present time. There is no particular line that seems to be better than any other, but a general line of work keeps him busy.—R. B. M.

NEWS OF THE METAL INDUSTRY GATHERED FROM SCATTERED SOURCES

The Atwater Manufacturing Company, Southington, Conn., has begun the erection of an addition of 100 feet to its polishing room and of a 70 foot extension to its forge shop.

The brass and aluminum foundry which is being erected by Foster Brothers, experienced foundrymen, of Cedar Falls, Iowa, is nearing completion, and covers about 1,500 feet of floor space.

The Celluloid Zapon Company have opened an office in New Haven at 185 Church street. After June 1 they will be pleased to have all orders and inquiries from New England sent to that address.

The United Smelting & Aluminum Company, manufacturers of aluminum in ingots, alloys, sheets, rods, etc., New Haven, Conn., has appointed W. H. Allen, 405 Fulton building, Pittsburgh, Pa., as sales representative in that district.

The Wilder Metal Coating and Manufacturing Company, Connellsville, Pa., report that they do not expect to rebuild the plant which was recently destroyed by fire, but expect to move to a new location, which will be decided on in the near future.

The Taunton-New Bedford Copper Company, New Bedford, Mass., has awarded the contract for a machine shop and rolling mill to cost about $200,000. Besides the two mentioned departments the company operates departments for smelting, refining, tinning and polishing.

The International Nickel Company, New York, N. Y., has issued its fifteenth annual report for the fiscal year ending March 31, 1917. The net profits for the fiscal year, after having deducted expenses, depreciation, exhaustion of minerals and other charges, were $13,557,970.17.

Pass & Seymour, Inc., Solway, N. Y., manufacturer of electrical specialties, is constructing a three-story, 60 x 185 feet, addition to its plant. The company operates a brass machine shop, tool and grinding room, galvanizing, stamping, tinning, plating, polishing, japanning and lacquering departments.

The Duplex Metallic Company, Conshohocken, Pa., announce that they have surplus rolling mill facilities and are ready to accommodate concerns in need of wire, rods, rounds or other shapes from 3/8 inch to 3 1/8 inch diameter or equal area.

The Salem Brass and Iron Foundry Company, Salem, N. J., completed the reconstruction of and remodeling of the Hess Steel Company's plant which is now ready for machinery and equipment. The plans for an early opening are not very encouraging because of the difficulty in securing the needed machinery.

The Zenite Metal Company, manufacturer of automobile molding, stampings, dies, bearing metals, etc., West and Ohio street, Indianapolis, Ind., is building an addition to its factory and installing new presses to double its present capacity for stamped

work. The company operates a tool room, plating, stamping, polishing and lacquering departments.

Rome Manufacturing Company, manufacturers of copper and brass goods, Rome, N. Y., is building a two-story, 50 x 300 feet, addition to its factory which will be used to relieve the congested condition in its factory at the present time. The company is also erecting an office building, 65 x 200 feet, two stories, and report that they are not in the market for any equipment.

The increased use of lacquers and lacquer enamels in New England and the fact that special finishes are being called for more than ever, has made it necessary to open this new office, in order to give their customers the service that it has been the policy of this company to give. Newton E. Dabolt, who has been in charge of the New York City territory for several years, will be manager of the New England division, and George J. Karl, of the New York office, will assist him.

The Bridgeport Brass Company, Bridgeport, Conn., will build two additions to its Standard Brass & Copper Company plant at New London, Conn. One building will be 60 x 145 feet, one story and the other, 45 x 65 feet, one story. The plant at New London operates a brass machine shop, tool and grinding room, brass stamping, brazing, plating, soldering, polishing, japanning and lacquering departments and manufactures brass sheets, rods and tubes.

The Franklin Institute, Philadelphia, Pa., announces that on May 16 the Franklin medal was presented to His Excellency Chevalier Van Rappard on behalf of the Royal Netherlands government for Hendrik Antoon Larentz, Ph. D., F. R. S., president of the Royal Academy of Sciences, Amsterdam, and professor of mathematical physics, University of Leiden, and also the presentation of the Franklin medal to David Watson, Taylor, D. Eng., chief constructor, Chief of Bureau of Construction and Repair, United States Navy.

The Victor Aluminum Manufacturing Company, manufacturers of "Victor" pure aluminum, Wellsville, N. Y., have let the contract for the erection of a main building, 140 x 90 feet, to replace the one recently destroyed by fire. This building will be used entirely for manufacturing aluminum, as the shipping room, storage sheds and power house were not damaged by the fire, and it is also expected that the building will be ready for occupancy about July 1. The company operates a tool and grinding room, rolling mill, cutting-up shop, spinning, stamping and tinning departments.

The Forsyth Metal Goods Company, manufacturer of household and hardware specialties, etc., Buffalo, N. Y., has moved into its new plant at East Aurora, N. Y., and is now provided with ample floor space for the manufacture of its goods. The general offices will be at the plant. The departments operated at the new plant are stamping, galvanizing, tinning, plating, polishing, japanning and lacquering.

Ernest Vatier, manufacturer of fine art castings in bronze, silver and gold, 549 West Twenty-second street, New York, reports that he has offered the facilities of his plant to New York City, and he has received the following letter of thanks from Mayor Mitchel:

City of New York,
Office of the Mayor.

April 10, 1917.

Dear Mr. Vatier:

The Mayor asks me to thank you most cordially for your letter. Your offer is a fine one, and you may be sure the City Government will accept it, should the need arise. I have taken the liberty of sending copies of your letter to the Police Commissioner, Admiral Usher, General Wood and Mr. Willard Straight, chairman of the Mayor's Defense Committee.

Very truly yours, T. ROUSSEAU,
(Signed) Secretary to the Mayor.

Mr. Ernest Vatier, 545 West Twenty-second street, New York City.

INCREASE IN CAPITAL STOCK

The Metals Refining Company, Hammond, Ind., has increased its capital stock from $25,000 to $200,000.

CHANGE IN FIRM NAME

The Driver-Harris Wire Company, Harrison, N. J., has filed notice of change in its name to the Driver-Harris Company, at the same time increasing its capital. The name of the company has been changed because its line has grown so as to include lines other than wire, such as producing special castings for use at high temperatures, and manufacturing metal sheet and strip, in steel, nickel and various alloys.

FOREIGN TRADE OPPORTUNITIES

For addresses of these inquiries apply to Bureau of Foreign and Domestic Commerce, Washington, D. C., and give file numbers.

24567—An agency is desired by a firm in France for the sale of grinding wheels.

24583—An agency is desired by a man in Switzerland for the sale of metals and hardware.

24524—An agency is desired by a purchasing association in Switzerland for the sale of raw materials, such as wire, tools, machinery of all kinds, copper, antimony, lead, zinc, railway material. Quotations should be made f. a. s. New York or c. i. f. Marseilles, France. Payment will be made in New York. Correspondence may be in English. References.

24597—An agency is desired by a man in Italy for the sale of wire, tubes, metal plates, metal rods of all kinds. Correspondence should be in Italian, French or Greek. Quotations should be made c. i. f. destination. Reference. Answers should be wired, if possible.

24460—An agency, on a commission basis, is desired by a man in Argentina for the sale of hardware and metals in general. Quotations should be made c. i. f. destination or Buenos Aires, if possible. Payment will be made by cash against documents after arrival of merchandise subject to inspection by purchaser in customhouse. Correspondence may be in English. References.

Brass and Copper, No. 23104.—A firm in Spain is in the market for copper and brass in sheets, rods, and bars, seamless copper tubes, soldered brass tubes, and brass and copper wire. Correspondence may be in English, but Spanish is preferred. References. Complete particulars giving quantities, sizes, etc., may be obtained from the Bureau or its district offices.

REMOVAL

Farrar and Trefts, Inc., Buffalo, N. Y., announce the appointment of Henry F. Russell, formerly with the Lumen Bearing Company, also of Buffalo, sales manager of their grey iron foundry department.

James Savage, 260 Newell street, Brooklyn, N. Y., has moved to his old location at 203 Diamond street, where he has now greatly enlarged facilities for carrying on foundry operations for the production of metal castings.

Herman A. Holz, sales representative for the Erichsen sheet metal testing machine and Brinell testing meters and compensated pyrometers, has moved his office from 50 Church street to the Metropolitan Tower, 1 Madison avenue, New York.

A. J. Corcoran, Inc., manufacturers of wooden tanks for galvanizing, electroplating, chemicals, etc., have moved their office at 11 John street, New York, to their factory at 761 Jersey avenue, Jersey City, N. J., where new offices provide better facilities for handling business and showing goods.

INCORPORATIONS

Business organizations incorporated recently. In addressing them it is advisable to include also the names of the incorporators and their residence. Particulars of additional incorporations may frequently be found in the "Trade News" columns.

To manufacture and deal in metals, machinery and implements.—Joy Motor Manufacturing Company, Chicago, Ill. Capital, $50,000.

To manufacture brass products—The New Jersey Brass Corporation, Garfield, N. J., has been incorporated with a capital of $100,000. C. E. Sanders is local representative.

To engage in electro plating work—Merigold Electro Plating Company, Newark, N. J. Capital, $10,000. Incorporators: John L. Merigold, Oliver J. Sizelove and L. M. Sizelove.

To manufacture and deal in emblems and medals of all kinds—Fred Koch Company, West Hoboken, N. J. Capital, $25,000. Incorporators: Fred Koch, George V. Smith and Edward J. Poynton.

To manufacture metal novelties.—The Tamco Manufacturing Company, Dayton, Ohio. Capital, $1,000. Incorporators: J. Winters Thomas, Katharine Thomas, Alford C. Appleton, Maxwell C. Whitmore and John Q. A. Johnson, Jr.

To deal in metals.—The Warren Metal Company, Warren, Ohio. Capital, $50,000. Incorporators: Roy Knofsky, Jacob Knofsky, Isador Knofsky, Ida L. Knofsky and Floyd S. Williams.

To manufacture and deal in metals, etc.—Force and Steel, Inc., Newark, N. J. Capital, $20,000. Incorporators: William H. Force, Alexander N. Steel, Newark, N. J., and Nelson R. Horsley, Springfield, Mass.

To manufacture and deal in jewelry, gold, silver, copper, brass, etc.—Ording Company, Newark, N. J. Capital, $10,000. Incorporators: Joseph G. Fisher, John W. Bostwick, Newark, N. J., and Fred Ording, Jersey City, N. J.

To operate a brass foundry.—The Lincoln Brass Foundry Company, Chester, Pa. Capital, $5,000. Incorporator: W. F. Mathues and J. A. Worrell. The company is at the present time building a modern brass foundry located at Fifth and Jeffrey streets.

INQUIRIES AND OPPORTUNITIES

Under the directory of "Trade Wants" (published each month in the rear advertising pages), will be found a number of inquiries and opportunities which, if followed up, are a means of securing business. Our "Trade Want Directory" fills wants of all kinds, assists in the buying and selling of metals, machinery, foundry and platers' supplies, procures positions and secures capable assistants. See Want Ad. pages.

PRINTED MATTER

Bronzes.—Thomas Paulson & Son, brass founders and engineers and manufacturers of Hecla anti-friction bronze, have issued another one of their interesting series of art calendars, the back of which is devoted to the description of Hecla bronze.

Crucibles.—Robert J. Taylor, Inc., Philadelphia, Pa., has issued a very compact little calendar for 1917. The calendar is held together by an artistic finished piece of very thin yellow brass, which serves as a good example of the possibilities of rolling brass.

Corkboard Insulation.—The Armstrong Cork & Insulating Company, Pittsburgh, Pa., has issued a very interesting little booklet giving data and necessary information relating to their Nonpareil corkboard insulation used for cold storage plants and warehouses and all other plants where refrigeration is necessary.

Welfare Work.—The Kohler Industries, manufacturers of upright and grand pianos, player pianos, electric player pianos, player piano actions and accessories, New York, N. Y., have issued a handsome little booklet of twenty-eight pages giving complete description of the welfare work that is carried on by the Board of Governors of the Kohler Industries.

Grinding Wheel Data.—The Webster and Perks Tool Company, Springfield, Ohio, has issued a very handy and serviceable card enclosed in a celluloid case. This card has on it handily arranged for quick calculation the table of grinding wheel speeds and table of circumferences. The case is 3 by 5½ inches, which makes it a very convenient size for carrying in the vest pocket.

Tripoli Products.—The Seneca Tripoli Company, St. Louis, Mo., has issued a very complete little booklet of fifty-two pages giving descriptions of their varied tripoli products. The company states that it is the first publication of this kind in existence and that copies of same may be procured free of charge by addressing them at 658-659 Pierce Building, St. Louis, Mo.

Water Works Pumps.—The De Laval Steam Turbine Company, of Trenton, N. J., builder of the largest pumps of this type, has just issued, under the title "Progress in Water Works Pumps," a 48-page booklet discussing the general economic and engineering conditions affecting the design and installation of such pumps. Installations in fifteen of the principal cities of this country and Canada are described, including 34 units aggregating 999,000,000 gals. per day capacity. The publication should be of value to anyone interested in the handling of water in large quantities.

Pyrometers.—The Potentiometer System of Pyrometry is described in a twenty-eight page, 8 by 10½-inch publication, issued by the Leeds and Northrop Company, Philadelphia, Pa. The potentiometer pyrometer is based upon the use of the thermocouple, but differs from the ordinary deflection galvanometer or millivoltmeter pyrometer in that the electromotive force resulting from the difference in temperature between the hot and cold ends of the thermocouple is measured by a novel balancing method rather than by a deflecting galvanometer. The increased amount of attention being given to heat treatment problems at the present time should render this pamphlet of value to all users of metals.

PRINTED MATTER

Hand Squeezers.—The National Founders' Association, through the Committee on Foundry Methods, has just issued No. 6 of their Service Board Bulletins. This bulletin contains twenty-four pages and gives illustrations and complete descriptions of the various types of hand squeezers. These types are classified as stationary, portable and straddle-leg types, and all of these types are simply and fully described. The bulletin also contains descriptions and illustrations of aluminum and steel pattern plates, match boards, lifting devices, coke and bottom boards, flasks, vibrators and sprue cutters. Directions are also given for making squeezer plates and the bulletin closes with an essay on the importance of time studies in the foundry. Copies of this bulletin may be had by applying to the National Founders' Association, Chicago, Ill.

CATALOG EXHIBIT

An exhibition of every kind of catalog may be seen at The Metal Industry office, 99 John street, New York. The Metal Industry is prepared to do all of the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding, for the entire job from beginning to end or any part of it.

METAL MARKET REVIEW

WRITTEN FOR THE METAL INDUSTRY BY W. T. PARTRIDGE

JUNE 4, 1917.

COPPER.

With the beginning of May a stronger tone with higher prices—an advance of 1.00c. per pound to 32c. for May, 31c. for June and 30c. for July—was an encouraging feature in the trade, which had fretted under April conditions. The expectation that Government needs would soon be known and the price fixed for sales to the United States, was not realized by the 31st, and the uncertainty in this matter had again produced a depressing effect in the closing days of the month, when a waiting attitude developed, causing prices to recede—after having advanced to 32 to 33 cents for prompt prime Lake, and 32.50 to 33 cents for electrolytic—to the level of May 1.

TIN.

Tin in May was notable both for strength and for the sensational advances in prices at home and abroad. A net rise here of 5 cents per pound, from 59 cents May 1 to 64 cents May 31, being registered, although the highest point reached was 66.50 cents during the third week, after which prices were easier. Abroad prices advanced £21 in the third week to £256 for spot Straits and standard tin, the highest point, after which a recession was noted to £253 10s. at the close of the month.

SPELTER.

Activity in the spelter trade during May was spasmodic, with periods of dullness and only a moderately fair volume of business transacted. The announcement that the Government will pay 11.50 cents per pound, delivered, for grade A; 11 cents for grade B, and 9 cents for grade C, prime Western, was the prominent feature of interest, especially with grade C protected against future decline. The first order given by the Government was for 25,000,000 pounds to be delivered over the next twelve months; of this amount only 504,000 pounds were for prime Western, not a sufficient amount to produce any appreciable effect upon the market. An interesting development was the fact that prompt May metal and future positions were held at the same price, and actual sales of future positions made at these figures, the strength of the future deliveries being greater than for the prompt position. On the 31st sales were made on the basis of 9¼ cents St. Louis and 9.67½ cents New York.

LEAD.

Lead in May will be remembered as leading all other metals in sustained strength with continuous active business transacted. The scarcity of metal was so pronounced at times that the demand for spot could not be satisfied. Twice during the month the American Smelting & Refining Company advanced its official price ½ cent, a total of 1 cent to the basis of 10 cents New York and 9.92½ cents St. Louis. A net advance of 1½ cents per pound in outside prices was registered; spot selling on the 31st at 11.50 cents New York; 11½ cents St. Louis, while June was held at 11½ cents New York and 11¼ to 11½ cents St. Louis.

ALUMINUM.

Points of interest to the aluminum trade in May were first the report of the United States Geological Survey, which gave increased production of bauxite as 43 per cent in quantity and 52 per cent in value over 1915, a notable increase for the entire United States, but principally for Georgia and Alabama, where the gain in production was 86 per cent over the previous annual output; second, was the report of plant extensions to a capacity of 100,000,000 pounds, equivalent to half the world's production. A reliable aluminum soldering compound and a new method of galvanizing aluminum in such a way as to make plating of the metal an entire success, were also reported. Prices remained unchanged in a very quiet market throughout the month at 59 to 61 cents for No. 1 Virgin; 56 to 58 cents for 98 to 99 per cent pure remelted, and 41 to 43 cents for No. 12 alloy remelted.

ANTIMONY.

The greater strength and activity of future deliveries, in comparison with the declining prices and relative weakness of the prompt position, continued to attract the attention of the antimony trade during May. A net decline of 9.50 cents was registered on prompt May positions from 32 to 32.50 cents on May 1 to 22.50 to 25 cents on the 31st; but prices on this position dropped to 22 cents, the lowest point, on May 9, when futures were firm and strong at 16.50 cents c. i. f. New York, in bond, and June shipments from the Orient were held at 15 cents.

QUICKSILVER.

Accumulated stocks of quicksilver in combination with a long-continued period of dullness accentuated the downward trend of prices during May, which receded $2 to $5 per flask at a time until a total decline of $13 per flask to $100 was noted on the 31st.

SILVER.

United States Government purchases of silver, amounting to 2,000,000 ounces during May, combined with the prediction that much larger quantities of the metal would soon be needed for coinage, were prominent points of interest in the silver market for the month. India, after being the principal buyer for a considerable period, curtailed purchases during the last fortnight and China did likewise.

Prices fluctuated in a range of ¾ cent per ounce, from 74⅜ cents on May 1 to 75⅛ cents, the highest point, on May 3, after which the range was back and forth between 74⅝ and 74⅞ cents for nearly a week, closing at the higher figures on the 31st.

PLATINUM.

More than usual interest in platinum was noted in the general public press during May, due to the wartime need of this metal, which is in very limited supply. Palau, a substitute alloy made of gold and palladium, was brought out by a California firm and tested by the United States Government, which announced that it could be used in making crucibles for definite purposes instead of platinum, thus helping to conserve the supply of platinum for imperative requirements. Prices throughout the month remained at the high level established in March, at $105 for pure and $110 for 10 per cent iridium.

OLD METALS.

Uncertainty regarding Government prices to be paid for copper affected allied scrap early in May, hampering activity, but lead was strong, advancing ¼ to ½ cent along the entire list. With renewed confidence, after improved conditions had developed in the major market, copper scrap recovered strength and advanced slightly. There was some irregularity noted at this time in other lines. During the last half of the month the strength of lead and tin became very apparent in advancing prices for the scrap metal. The small stocks held by dealers in warehouses really limited transactions, but a developing optimistic sentiment was noted that expressed itself in vigorous expectations of an urgent demand. Aluminum was in active demand with keen competition among traders, and maintained the high price levels previously established. Local trade was very good, and prices, with few exceptions, advanced in a range of 1 to 3 cents per pound.

WATERBURY AVERAGE

The average prices of Lake Copper and Brass Mill Spelter per pound as determined monthly at Waterbury, Conn.:

Lake Copper, 1916—Average for year, 28.77. 1917—January, 32.25. February, 35.25. March, 35.50. April, 32.75. May, 32.00.

Brass Mill Spelter, 1916—Average for year, 17.725. 1917—January, 13.05. February, 13.80. March, 13.45. April, 11.85. May, 11.05.

MAY MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER.			
Lake	33.00	30.50	31.898
Electrolytic	33.00	31.00	32.318
Casting	31.12½	27.50	30.108
TIN	66.50	58.50	63.295
LEAD	11.50	10.00	10.710
SPELTER	9.67½	9.30	9.479
ANTIMONY	32.50	22.50	25.568
ALUMINUM	61.00	59.00	60.00
QUICKSILVER (per flask)	$113.00	$100.00	$106.636
SILVER (cts. per oz.)	75⅛	74⅜	74.745

Metal Prices, June 4, 1917

NEW METALS.

	Price per lb.
COPPER—DUTY FREE. PLATE, BAR, INGOT AND OLD COPPER. Manufactured 5 per centum.	
Lake, carload lots, nominal	32.00
Electrolytic, carload lots	33.00
Casting, carload lots	31.00
TIN—Duty Free.	
Straits of Malacca, carload lots	62.75
LEAD—Duty Pig, Bars and Old 25%; pipe and sheets.	
20%. Pig lead, carload lots	11.50
SPELTER—Duty 15%.	
Brass Special	9.85
Prime Western, carload lots, nominal	9.675
ALUMINUM—Duty Crude, 2c. per lb. Plates, sheets, bars and rods, 3½ per lb.	
Small lots, f. o. b. factory	67.00
100-lb. f. o. b. factory	64.00
Ton lots, f. o. b. factory	60.00
ANTIMONY—Duty 10%.	
Cookson's, Hallet's or American	Nominal
Chinese, Japanese, Wah Chang WCC, brand spot	23.00
NICKEL—Duty Ingot, 10%. Sheet, strip and wire 20% ad valorem.	
Shot or Ingots	50 and 55c.
ELECTROLYTIC—5 cents per pound extra.	
MANGANESE METAL	Nominal
MAGNESIUM METAL—Duty 25% ad valorem (100 lb. lots)	$3.00
BISMUTH—Duty free	$3.00
CADMIUM—Duty free	nominal $1.60
CHROMIUM METAL—Duty free	.75
COBALT—97% pure	$1.70
QUICKSILVER—Duty, 10% per flask of 75 pounds	$96.00
PLATINUM—Duty free, per ounce	$105.00
SILVER—Government assay—Duty free, per ounce	.75⅛
GOLD—Duty free, per ounce	$20.67

INGOT METALS.

	Price per lb.
Silicon Copper, 10%	according to quantity 43 to 45
Silicon Copper, 20%	" " 53 to 55
Silicon Copper, 30% guaranteed	" " 55 to 60
Phosphor Copper, guaranteed 15%	" " 62¾ to 66
Phosphor Copper, guaranteed 10%	" " 62¼ to 65
Manganese Copper, 30%, 2% Iron	" " 75 to 80
Phosphor Tin, guaranteed 5%	" " 74 to 76
Phosphor, Tin, no guarantee	" " 55 to 60
Brass Ingot, Yellow	" " 23¼ to 26
Brass Ingot, Red	" " 28½ to 31
Bronze Ingot	" " 29 to 31
Parsons Manganese Bronze Ingots	" " 33½ to 35
Manganese Bronze Castings	" " 39 to 48
Manganese Bronze Ingots	" " 28 to 34
Phosphor Bronze	" " 34 to 36
Casting Aluminum Alloys	" " 45 to 47

OLD METALS.

Dealers' Buying Prices.		Dealers' Selling Prices.
25.00 to 29.00	Heavy Cut Copper	28.00 to 30.00
26.00 to 27.50	Copper Wire	28.00 to 30.00
23.50 to 24.00	Light Copper	26.00 to 27.00
22.50 to 23.00	Heavy Mach. Comp	26.00 to 27.50
16.00 to 16.50	Heavy Brass	17.50 to 20.00
12.50 to 13.50	Light Brass	14.50 to 17.00
16.50 to 17.00	No. 1 Yellow Brass Turning	22.00 to 25.00
19.00 to 20.00	No. 1 Comp. Turnings	18.50 to 20.00
9.00 to 9.75	Heavy Lead	9.75 to 11.00
8.50 to 7.00	Zinc Scrap	7.50 to 8.00
23.00 to 23.50	Scrap Aluminum Turnings	25.00 to 25.50
33.00 to 34.00	Scrap Aluminum, cast alloyed	36.00 to 37.00
49.00 to 50.00	Scrap Aluminum, sheet (new)	52.00 to 53.00
39.00 to 40.00	No. 1 Pewter	45.00 to 48.00
30.00 to 32.00	Old Nickel	34.00 to 36.00
23.00 to 25.00	Old Nickel anodes	26.00 to 27.00

PRICES OF SHEET COPPER.

Mill shipments (hot rolled) ..... 40c. base net
From stock ..... 42c. base net

SIZE OF SHEETS. Width.	LENGTH.	64 oz. and over.	32 oz. to 64 oz.	24 oz. up to 32 oz.	16 oz. up to 24 oz.	15 oz.	14 oz.	13 oz.	12 oz.	11 oz.
		Extras in Cents per Pound for Sizes and Weights Other than Base.								
Not wider than 30 ins.	Not longer than 72 inches.	Base	Base	Base	Base	½	1	1½	2	2½
	Longer than 72 inches, Not longer than 96 inches.	"	"	"	"	½	1	2	3	4½
	Longer than 96 inches, Not longer than 120 inches.	"	"	½	1	2	3	5	7	
	Longer than 120 ins.	"	"	1	1½					
Wider than 30 ins., but not wider than 36 inches.	Not longer than 72 inches.	"	"	Base	Base	1	2	3	4	6
	Longer than 72 inches, Not longer than 96 inches.	"	"	"	"	1	2	4	6	8
	Longer than 96 inches, Not longer than 120 inches.	"	"	1	2	3	4			
	Longer than 120 inches.	"	1	2	3					
Wider than 36 ins., but not wider than 48 inches.	Not longer than 72 inches.	"	Base	1	2	3	4	6	8	9
	Longer than 72 inches, Not longer than 96 inches.	"	"	1	3	4	5	7	9	
	Longer than 96 inches, Not longer than 120 inches.	"	"	2	4	6	9			
	Longer than 120 inches.	"	1	3	6					
Wider than 48 ins., but not wider than 60 inches.	Not longer than 72 inches.	"	Base	1	3	5	7	9	11	
	Longer than 72 inches, Not longer than 96 inches.	"	"	2	4	7	10			
	Longer than 96 inches, Not longer than 120 inches.	"	1	3	6					
	Longer than 120 inches.	1	2	4	8					
Wider than 60 ins., but not wider than 72 ins.	Not longer than 96 inches.	Base	1	3	8					
	Longer than 96 inches, Not longer than 120 inches.	"	2	5	10					
	Longer than 120 inches.	1	3	8						
Wider than 72 ins., but not wider than 108 ins.	Not longer than 96 inches.	1	3	6						
	Longer than 96 inches, Not longer than 120 inches.	2	4	7						
	Not longer than 120 inches.	3	5	9						
Wider than 108 ins., but not wider than 120 ins.	Not longer than 120 inches	4	6							

The longest dimension in any sheet shall be considered as its length.

CIRCLES, 8 IN. DIAMETER AND LARGER, SEGMENTS AND PATTERN SHEETS, advance per pound over prices of Sheet Copper required to cut them from 3c

CIRCLES LESS THAN 8 IN. DIAMETER, advance per pound over prices of Sheet Copper required to cut them from 5c

COLD OR HARD ROLLED COPPER, 14 oz. per square foot and heavier, advance per pound over foregoing prices ..... 1c.

COLD OR HARD ROLLED COPPER, lighter than 14 oz. per square foot, advance per pound over foregoing prices ..... 2c.

COLD ROLLED ANNEALED COPPER, the same price as Cold Rolled Copper.

ALL POLISHED COPPER, 20 in. wide and under, advance per square foot over the price of Cold Rolled Copper ..... 1c.

ALL POLISHED COPPER, over 20 in. wide, advance per square foot over the price of Cold Rolled Copper ..... 2c.

For Polishing both sides, double the above price.

The Polishing extra for Circles and Segments to be charged on the full size of the sheet from which they are cut.

COLD ROLLED COPPER, prepared suitable for polishing, same prices and extras as Polished Copper.

ALL PLANISHED COPPER, advance per square foot over the prices for Polished Copper ..... 1c.

Metal Prices, June 4, 1917

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect May 24, 1917.

To customers who buy over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.36¼	$0.39	$0.41¾
Wire	.36¼	.39	.41¾
Rod	.34¼	.39¾	.42¾
Brazed tubing	.43½	——	.49¼
Open seam tubing	.43½	——	.49¼
Angles and channels	.43½	——	.49¼

To customers who buy over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.38¼	$0.41	$0.43¾
Wire	.38¼	.41	.43¾
Rod	.36¼	.41¾	.44¾
Brazed tubing	.45½	——	.51¼
Open seam tubing	.45½	——	.51¼
Angles and channels	.45½	——	.51¼

[Note.—Net extras for quality for both sections of above metal prices are not quoted due to the fluctuations in the price of zinc.—Ed.]

BARE COPPER WIRE—CARLOAD LOTS.

34½c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order	47c.	per lb. base
100 lbs. to 300 lbs. in one order	47½c.	" " "
Less than 100 lbs. in one order	49c.	" " "

PRICES FOR SEAMLESS BRASS AND COPPER TUBING.

From 1¼ to 8½ O. D. Nos. 4 to 13 Stubs' Gauge, — per lb.
Seamless Copper Tubing, — per lb.

For other sizes see Manufacturers' List.

Due to fluctuations of the metal market we are unable to quote these prices.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron pipe sizes with price per pound.

⅛ ¼ ⅜ ½ ¾ 1 1¼ 1½ 2 2½ 3 3½ 4 4½ 5

Due to fluctuations of the metal market we are unable to quote these prices.

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

Due to fluctuations of the metal market we are unable to quote these prices.

PRICES FOR TOBIN BRONZE AND MUNTZ METAL.

Tobin Bronze Rod	40½c.	net base
Muntz or Yellow Metal Sheathing (14" x 48")	36c.	" "
Muntz or Yellow Metal Rectangular sheets other than sheathing	43c.	" "
Muntz or Yellow Metal Rod	36c.	" "

Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bar in the rough, 65c. net.

German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.

Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturer.

PRICES OF NICKEL ANODES.

85 to 87% purity	50c.	per lb.
90 to 92% "	52½c.	" "
95 to 97% "	55c.	" "

PRICE SHEET FOR SHEET ALUMINUM—B. & S. Gauge.

Base price, 60c.

We are unable to quote these prices, but they can be had upon application to manufacturers and dealers.

PRICE LIST SEAMLESS ALUMINUM TUBING.

We are unable to quote these prices, but they can be had on application to manufacturers and dealers.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

We are unable to quote these prices.

PRICES OF SHEET ZINC.

Duty, sheet, 15%.	Cents per lb.
Carload lots, standard sizes and gauges, at mill	19 cent basis, less 8%
Casks, jobbers' prices	21.00
Open casks, jobbers' prices	21.50

BASE PRICE GRADE "B" GERMAN SILVER SHEET METAL.

Quality.	Net per lb.	Quality.	Net per lb.
5%	48½c.	16%	53c.
8%	49½c.	18%	53½c.
10%	49¾c.	20%	55¼c.
12%	51½c.	25%	63c.
15%	52c.	30%	68½c.

GERMAN SILVER WIRE.

Quality.	Net per lb.	Quality.	Net per lb.
5%	50c.	15%	58c.
8%	52c.	16%	58½c.
10%	54c.	18%	60½c.
12%	56c.	30%	76c.

The above Base Prices are subject to additions for extras as per list printed in Brass Manufacturers' Price List and from such extras 50% discount will be allowed. The above base prices and discounts are named only to wholesale buyers who purchase in good quantities. Prices on small lots are considerably higher.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Sheet Block Tin—18" wide or less. No. 26 B. & S. Gauge or thicker. 100 lbs. or more 5c. over Pig Tin. 50 to 100 lbs. 6c. over, 25 to 50 lbs. 8c. over, less than 25 lbs. 10c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 3c. over Pig Tin. 50 to 100 lbs. 4c. over, 25 to 50 lbs. 5c. over, less than 25 lbs. 10c. over.

Above prices f. o. b. mill.

Prices on wider or thinner metal on request.

PRICES OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given, as prices range from 1c. below to 4c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2½c. to 3½c. above the price of bullion.

PRICES OF SOME METAL INDUSTRY CHEMICALS AND MATERIALS.

Phosphorus—Duty free, according to quantity	Nominal
Nickel Salts, Single bbl	14c. per lb.
Nickel Salts, Double bbl	11c. " "
Sodium Cyanide	Nominal
Silver Nitrate, 100 oz. lots	49.33c. per oz.
Sodium Carbonate (Sal Soda)	.05c. per lb.

Prices for Cotton Buffs.

Open buffs per 100 sections.

12 inch, 20 ply, 64/68, cloth	base $34.40
14 " 20 " 64/68, "	" 45.75
12 " 20 " 84/92, "	" 39.85
14 " 20 " 84/92, "	" 51.70

Sewed buffs per pound.

Bleached and unbleached	base 34c.
Colored	" 31c.